THE SYNTAX AND SEMANTICS OF ZERO VERBS: A MINIMALIST APPROACH

By

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Zero verbs are those transitive verbs of English, such as *bottle the wine* and *saddle the horse*, derived from nouns without derivational affixes. This dissertation presents a theoretical account for the high degree of productivity and for the semantic interpretability of these verbs, within the framework of Minimalism with no internal interface between the lexicon and the syntax. Previous explanations of the productivity and semantics of zero verbs have treated them as derived in the lexicon. However, the view developed and defended here is that the derivation of zero verbs is a strictly syntactic process, resulting from incorporation of the base noun with abstract lexical heads in a complex verb phrase (VP shell) structure, and occurring entirely within the computational system.

One advantage of the strictly syntactic approach to the derivation of zero verbs within the Minimalist framework is that it reduces the lexical burden. Two main theoretical problems result from the syntactic approach, however. One is that the VP shell structure on which the verb is derived requires that the base noun originate in an argument position, and as such it must be assigned a thematic role. This problem is resolved by utilizing both

a generalized configurational definition of thematic roles and a universal semantic feature [±central] associated with the category preposition to ensure that the base noun meets the output conditions of Full Interpretation. Under the Minimalist approach, further details of the semantics of zero verbs are held to depend on extralinguistic factors.

The other problem with a syntactic approach to zero verbs has to do with the occurrence of cognate prepositional phrases as in *bottle the wine in green bottles*. The problem is to explain how such prepositional phrases can occur along with the base noun in a syntactic structure without violating the Theta Criterion. To solve this problem, the process of noun incorporation is defined here as an automatic instance of theta role absorption, based on analogy with the passive *by*-phrase.

The resolution of these two problems leads to a coherent analysis of zero verb derivation consistent with principles of Universal Grammar within the Minimalist framework.

CHAPTER 1
INTRODUCTION

This dissertation represents a theoretical analysis of the syntax and semantics of transitive zero verbs in English. Zero verbs are verbs derived from concrete nouns without the use of derivational affixes.[1] Some examples are:

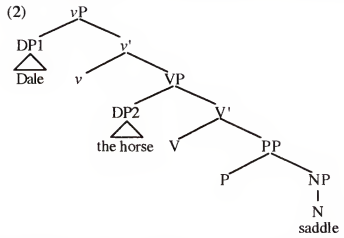
(1) to *bottle* the wine
to *shelve* the books
to *saddle* the horse
to *paint* the house
to *coil* the rope
to *anchor* the boat
to *hammer* the nail

Such verbs are extremely productive in English, and new verbs of this type are constantly entering our vocabulary. The goal of my dissertation research is to account for this high degree of productivity and for the semantic interpretability of these verbs, within the framework of Minimalism. Minimalism is the most recent program for conducting linguistic analysis under the theory of Universal Grammar (Chomsky, 1995). Zero verbs are a particularly promising focus of Minimalist analysis since pre-Minimalist attempts to analyze them have been incomplete and/or theoretically inconsistent. A thorough and theoretically sound analysis of zero verbs, therefore, will not only advance linguistic theory but will also contribute to a better understanding of the principles of the human language faculty responsible for a highly productive word formation process.

In Minimalism, the human language faculty is composed of two parts, the lexicon and the computational system. The lexicon provides the input to the computational system. Operations of the computational system arrange lexical items into linguistic expressions that are interpretable at the output. Crucially, there are no interpretability conditions on the

input to the computational system. This is in contrast to previous views of the language faculty in which principles such as the Theta Criterion, the Projection Principle, and Full Interpretation determined the deep-structure level of syntax at the internal interface with the lexicon (i.e. at the input). In the Minimalist framework, there is no internal interface, Full Interpretation is a condition on output only, and both the Projection Principle and deep-structure have been dispensed with. Instead, operations of the computational system (i. e., syntactic operations) check the features of lexical items, eliminating uninterpretable features once checked. If such features are not properly checked and eliminated, the derivation of the linguistic expression crashes. Otherwise the derivation proceeds until only interpretable features remain, thus constructing a linguistic expression that is interpretable at the output.

Hale and Keyser (1993, 1997, 1998) have proposed an analysis of some zero verbs based on the Projection Principle. They suggest that such verbs project a complex VP shell structure (Larson 1988) from the lexicon to deep structure. For example, the verb *saddle* projects the following structure, where *v*, V, and P are phonologically null (abstract) heads, and the DPs are inserted at deep structure (cf. Hale & Keyser 1993:95):



Hale and Keyser demonstrate that this lexical structure is formed by processes which are constrained by the same syntactic principles which operate in the computational system. Specifically, the verb *saddle* is formed by incorporation (Baker 1988, 1996b), successively

raising the noun *saddle* first to the abstract P, then to V, and finally to *v*, thus forming the transitive verb.

In essence, Hale and Keyser are proposing a dual syntax, including a lexical syntax (l-syntax) responsible for deriving the complex VP structure before it enters the computational system (s-syntax). In their view, principles of Full Interpretation operate in l-syntax to ensure interpretability at the output. In other words, Hale and Keyser's l-syntax is a level of interface between the lexicon and s-syntax. This view is inconsistent with the Minimalist framework as outlined above. Another problem with Hale and Keyser's analysis involves insertion of the direct object (DP2 in the diagram above). It has been pointed out that the meaning of the zero verb rests partially on the semantic relationship between the base noun and the surface direct object (Tyler 1996, 1998; Kiparsky 1997), as shown below:

(3) a. tape the music
(cf. record the music *on* tape)

b. tape the package
(cf. seal the package *with* tape)

(4) a. thread the beads
(cf. put beads *on* a thread)

b. thread the needle
(cf. put thread *through* a needle)

Since the interpretation of verbs such as *tape* and *thread* can only be accomplished at the output after collocation with the direct object, the Minimalist approach offers a more direct and persuasive way of explicating the syntax and semantics of zero verbs. Taking a Minimalist view, I maintain that in general zero verbs are not listed as items of the lexicon and are not derived before entering the computational system. Instead, I propose that the derivation of zero verbs is a strictly syntactic process, occurring within the computational system. This approach reduces the lexical burden but raises crucial syntactic and semantic issues to be resolved.

Chapters 2, 3, and 4 of this dissertation provide the basic background for the discussion of the crucial syntactic and semantic issues dealt with in subsequent chapters. In Chapter 2, I review in detail those portions of *The Minimalist Program* (Chomsky 1995) which deal with the lexicon and word formation processes, and I discuss how the Minimalist view of the lexicon will shape my analysis of the syntax and semantics of zero verbs. Adopting the view that the lexicon contains no computational processes, I conclude that the process of zero verb formation must occur entirely in the computational system and that productively derived zero verbs have no lexical entries distinct from their base nouns.

In Chapter 3, I provide a chronological review of Hale and Keyser's work on lexical argument structure, focusing on their analysis of zero verbs. I review in detail the major contributions they have made to the understanding of how syntactic principles operate in the formation of zero verbs, and I also discuss how their dual syntax model conflicts with the Minimalist program. I conclude with a summary of the theoretical problems to be solved under a strictly syntactic approach to zero verb formation.

In Chapter 4, I turn to the issue of productivity, which is a key factor in the analysis of zero verbs as being derived in the computational system. My view that zero verbs are derived syntactically implies that their productivity is unconstrained by lexical idiosyncrasies. I propose that on a Minimalist approach the properties of zero verbs which have traditionally been viewed as lexical properties should more appropriately be considered extralinguistic strategic and pragmatic properties.

In Chapters 5 and 6, I develop solutions to two main theoretical problems that arise under a strictly syntactic Minimalist approach to the derivation of zero verbs. The first problem has to do with the assignment of thematic roles, a crucial aspect of semantic interpretation. One contribution of Hale and Keyser's work has been the development of a configurational approach to thematic relations. They propose that the VP shell structure in (2) defines the thematic roles of two argument positions: Agent (causer of the action) is assigned to the DP1 position, and Patient (object affected by the action) is assigned to the

DP2 position. However, Hale and Keyser maintain that the third argument position, occupied by the base noun in (2), is not associated with any thematic role. This gap in the configurational approach to thematic roles presents a conflict between Hale and Keyser's analysis and the Minimalist program, since it is a basic principle of Minimalism that an argument without a thematic role violates the output condition of Full Interpretation (Chomsky 1995:363).

In Chapter 5, I address the issue of thematic role assignment and propose that the third argument position in the VP shell structure has a generalized role of Reference Object, defined configurationally as the complement of the lower verb. I further suggest that the configurational role of Reference Object can have one of two lexically specified roles—Theme or Goal—depending on a universal semantic feature associated with the category preposition. I conclude that this combination of configurational and lexical assignment of thematic roles satisfies the output requirements of the computational system and that further details of the semantics of zero verbs depend on extralinguistic factors.

Another theoretical problem raised by Hale and Keyser's analysis of zero verbs has to do with the occurrence of cognate prepositional phrases such as the example highlighted below:

(5) Dale saddled the horse *with Roy's saddle*

The problem is that the prepositional phrase of (5) cannot be inserted under the PP of the corresponding VP shell structure illustrated in (2) without violating general syntactic principles. To solve this problem, Hale and Keyser rely on their dual syntax, suggesting that insertion of the cognate PP is permitted in s-syntax after the processes of l-syntax have been completed. However, Hale and Keyser's approach is unworkable under the Minimalist approach taken here.

In Chapter 6, I outline a solution to the cognate problem by defining the process of incorporation that forms zero verbs as an instance of thematic role (theta) absorption, a mechanism accepted as standard in the analysis of passive constructions. This approach

solves the theoretical problem with cognate prepositional phrases by utilizing the established process of theta absorption rather than by relying on an exceptional lexical process.

In short, I present a coherent analysis of the syntax and semantics of zero verbs that is theoretically sound within the Minimalist framework. I have made an effort *not* to devise ad hoc mechanisms or add special constraints to the principles already accepted as standard in the literature. Instead, I have built conservatively upon the foundations established by Chomsky, Hale and Keyser, and others to demonstrate through the analysis of zero verbs the unique creative potential of the human language faculty.

Note

1. The term "zero verb" is my own invention, a shorter term for "zero derived verb." The term "zero derivation" basically means that "a certain stem is used for the formation of a categorically different word without a derivative element being added" (Marchand 1960:293). However, zero derivation has also been distinguished from category conversion on theoretical grounds. The term "conversion" has traditionally referred to the situation when a word has a function other than its normal one (e. g., the adjective *poor* having the function of a nominal *the poor*). In the theoretical debate over these terms, however, they are defined more concretely: zero derivation implies affixation of a phonologically null—or zero—morpheme, whereas conversion implies category change without affixation of any kind (for discussion see Pennanen 1971). Other terms used in the literature to describe the process of categorical change without overt derivational affixes are "functional change," "transposition," "categorical extension," "category shift," and "conflation."

CHAPTER 2
THE MINIMALIST LEXICON

1. Introduction: The Minimalist Program

1.1. Basic Concepts

Minimalism is the research program outlined by Chomsky (1995) for linguistic analysis based on the theory of Universal Grammar which holds that the language faculty is universal among humans. Furthermore, a language is viewed fundamentally as a pairing of sound and meaning. In Minimalist terms, this view of language suggests that the language faculty, a cognitive system, interacts with two mental performance systems: the articulatory-perceptual system (A-P) for sound, and the conceptual-intentional system (C-I) for meaning. These performance systems are external to the language faculty but operate on its output. The language faculty, therefore is described as interacting with the performance systems at two interface levels: the level of Phonetic Form (PF) at the A-P interface, and the level of Logical Form (LF) at the C-I interface.

The language faculty itself is assumed to consist of a computational system and a lexicon. The lexicon can be informally defined as a mental dictionary. The items listed in this mental dictionary are the elements of a language available for operations of the computational system. However, a lexical entry contains only the information that is not predictable about a lexical item. The computational system, on the other hand, operates according to a finite, and therefore discoverable, range of universal and language-specific principles. The computational system selects elements from the lexicon and combines them to form complex linguistic expressions. A linguistic expression is a pairing of a PF representation and an LF representation. In other words, the output of the computational

system is an expression whose phonetic form and logical form can be interpreted at the A-P and C-I interfaces, respectively. The operations of the computational system are constrained by this requirement of interpretability (called the principle of Full Interpretation). While it is obvious that languages differ greatly in their PF representations, they do not appear to vary in the LF representation of a given expression (Chomsky 1995:192). As Epstein et al. put it:

> On the assumption that the human conceptual-intentional performance system is an invariant property of the species, the interface representation called "LF" must be essentially identical in all languages. (1996:21)

Computational operations, therefore, are seen as occurring in different components of the computational system depending on whether they affect the phonological output, or the logical form, or both.

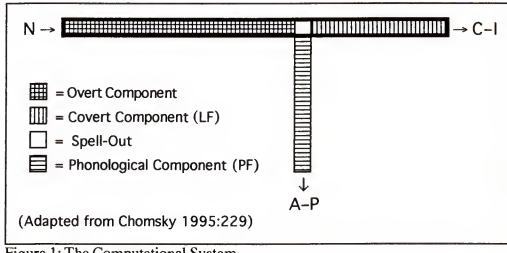


Figure 1: The Computational System

Operations that affect both PF and LF occur in the overt component. After these operations, a point is reached called spellout where the computation diverges into two components: the covert component and the phonological component (see Figure 1 above). When a derivation reaches spellout, it is essentially in its surface form. At spellout, the phonological content of the linguistic expression is "stripped away" and submitted to PF. The derivation of the linguistic expression continues after spellout, however, since its

surface form does not necessarily represent its logical form. Operations of the covert component, therefore, are a continuation of computations initiated in the overt component and lead to an LF representation. Operations at PF on the other hand, are fundamentally different from those of the overt and covert components, since the output of PF is constrained by conditions of the sensorimotor system (the A-P system). For this reason operations of the phonological component are not dealt with to any great extent in *The Minimalist Program*. In short, the aim of the Minimalist program is to define the computational operations which occur (overtly and covertly) in the process of deriving an LF representation from an array of lexical items. The array of lexical items is called a numeration (N); thus, in Minimalist notation, the focus is on the N → LF computation.

1.2. Computational Operations

The operations of the computational system are checking mechanisms to ensure that features associated with a lexical item (e. g., nominative, accusative, plural, etc.) match with the sound (PF) and interpretation (LF) they receive in a linguistic expression. The function of the computational system is, therefore, feature checking. It is in this sense that the operations of the computational system are characterized as "morphology-driven" since features (such as case) are generally associated with morphology.

There are just three types of operations in the computation from the numeration to LF: Select, Merge and Move. The operation Select refers to the selection of a linguistic element from the numeration. The numeration contains all the elements to be used in deriving the linguistic expression, so Select occurs repeatedly until the numeration is depleted. Merge is the operation which combines selected elements. There are three ways that Merge can take place:

1. Two selected elements can be merged to form a syntactic object;
2. One selected element can be merged with a syntactic object to form another syntactic object; or
3. Two syntactic objects can Merge to form yet another syntactic object.

Syntactic objects are constructed in pairs in this manner which means that all syntactic objects are binary branching. The derivation of a linguistic expression cannot be complete unless the operation Select has occurred often enough to deplete the numeration and the operation Merge has occured often enough to form a single syntactic object.

The third operation of the computational system, Move, involves elements which are already part of a syntactic object, and it is associated with feature checking. To be precise, the operation Move is characterized as "Move F," the movement of features (Chomsky 1995:261 ff.). Any formal feature associated with a syntactic element is raised to a position where it can be checked (i. e., the checking domain). Once all the features are checked, the derivation of a syntactic expression is said to "converge." If features are not checked—because, for example, they do not match with the features in the checking domain—then the derivation "crashes" and cannot be submitted to the interface for interpretation. However, features do not generally move independently of the lexical items they are associated with. Instead, a process of "pied-piping" occurs; when a feature is raised for checking it carries along with it all the other features associated with it that are necessary for the derivation to converge (Chomsky 1995:262).

Movement which takes place before spellout accounts for the linguistic phenomenon of "displacement." (This refers to what happens in a linguistic expression in which elements do not surface in the position where they are interpreted.) When a derivation reaches spellout, all the phonological content of the syntactic expression is stripped away and submitted to the PF component where phonological rules and certain morphological rules are applied. The derivation of the expression continues after spellout in the covert component. Movement which takes place after spellout involves movement of formal features without phonological content. In short, elements move only for the purpose of having their features checked; crucially, they do not move to acquire features. All the features necessary to drive the computational system are present at the input.

2. The Lexicon and Morphology

2.1. The Minimalist Lexicon

Minimalism has been characterized as invoking a strong lexicalist stance with regard to word formation (cf. Epstein, et al. 1996:9). Along the same lines, in describing the Minimalist program, Marantz asserts that lexical items "are taken from the lexicon fully inflected with inflectional affixes" (1995:366). If these interpretations of Minimalism are correct, then it must also be true that any derivations of the type discussed by Hale and Keyser (i. e., derivations of complex words) occur in the lexicon prior to entering the computational system. However, the strong lexicalist interpretations of Minimalism are somewhat misleading in view of the notion mentioned above that all computational operations occur post-lexically in the computational system. In actuality, computational operations in a Minimalist framework are operations on the features of a lexical item, not necessarily on the lexical item as a whole. Thus, Minimalism can be characterized as "strongly lexicalist" on the assumption that each lexical item entering the computational system carries with it all the features that will be subject to the computation. The general question raised by these considerations is whether the derivations proposed by Hale and Keyser should be recast in terms of operations on features, or whether Minimalism must admit of a dual syntax as assumed by Hale and Keyser. To address this question, it is necessary to outline in detail the Minimalist conception of the lexicon. In this section, I review the types of features associated with lexical items as they enter the computational system and summarize the contents of a lexical entry as defined in *The Minimalist Program*. I also discuss the view of morphology as a subcomponent of the computational system.

2.1.1. Types of features

Since the operations of the Minimalist computational system are operations on features associated with lexical items, an immediate question is: Where do the features come from? It is clear in Chomsky's description of Minimalism that all features relevant to

the computation (i. e., formal features) are associated with lexical items before entering the computational system. A strong lexicalist view would imply that this association of features with lexical items occurs in the lexicon. However, Chomsky proposes that many of the formal features are associated with a lexical item in "the transition to the numeration" (1995:238); in other words, they are "specified . . . by the operation that forms the numeration" (1995:237). Other features are specified in the lexical entry of a lexical item. This view demarcates two classes of features: *intrinsic* features are those which are specified in a lexical entry; *optional* features are those associated with a lexical item in the transition to the numeration (1995:237).

In Minimalism, a lexical item enters the computational system with all its features—both intrinsic and optional. The idea that optional features are associated with a lexical item by the operation that forms the numeration suggests that there might be a formal procedure responsible for the transition from lexicon to numeration. However, it is not clear that such a procedure is "computational" or rule-governed in some other way. Recall that the numeration is an array of lexical items, accessible by the operation Select in the computational system. Chomsky asserts that the formation of the numeration is "random" and that optional features are selected "arbitrarily" (1995:237). In essence, the contents of the numeration depend upon the choices of the speaker. Chomsky explains further that there is no need to provide a theoretical account for why certain items or features are included in the numeration and why others are not. This, he says, would be comparable to expecting a theory of integers to account for why one chooses to add 2 + 2 instead of 2 + 3. What the theory tries to explain is why 2 + 2 = 4 is true while 2 + 3 = 4 is not true (1995:231).

Another key classification of features essential to Minimalist theory has to do with the component where the features are relevant. Lexical items have three types of features: *phonological* features, relevant in the PF component; *semantic* features, relevant at the C-I interface; and *formal* features, relevant in the N → LF computation. Presumably there may

be optional as well as intrinsic features in each of these three categories. In general the formal features of a lexical item are optional—whether a verb is in present or past tense, and whether a noun is singular or plural, for example. One formal feature that is intrinsic, however, is the categorial feature of a lexical item (i. e., N, V, A, P). While the phonological features are normally intrinsic, there are also examples of lexical items that may have an optionally null phonological matrix, as with the complementizer *that* in English (Chomsky 1995:240). Conceivably, too, certain semantic features may be optional. For example a noun may be optionally concrete or abstract, as in the contrast between *She's at the school* and *She's at school.* As Chomsky points out, the distinction of features as phonological, semantic, and formal raises difficult issues, including the fact that formal features often relate to semantic properties (1995:230, 381 fn. 14). This issue will be discussed further in Section 3 below.

Another distinction made in Minimalism, having to do with formal features in particular, is the difference between interpretable and noninterpretable features [±Interpretable]. A [–Interpretable] formal feature is not interpretable at the C-I interface. This means that it must be deleted during the N → LF computation, since the C-I system can only interpret [+Interpretable] features. Formal features that are [–Interpretable] are automatically deleted once they are checked. Examples of [–Interpretable] features are the case feature of a noun and the case assigning feature of a verb, whereas features such as person, number, and gender as well as category are [+Interpretable] (1995:368).[1] Interpretable features do not have to be checked in the computational system; but if they are checked, they are not deleted because they must remain accessible for interpretation at the interface.

I will briefly mention another distinction associated with formal features in the Minimalist framework, that of strong versus weak features. Strong features result in movement prior to spellout, and they are typically associated with categorial features. For example, the strong [D] feature is responsible for effects of the Extended Projection

Principle (EPP) in English such that there is always a DP in the subject position of a finite clause. In short, strong features are checked before spellout, but weak features may be checked covertly.

2.1.2. Lexical entries

As described in *The Minimalist Program*, the lexicon consists of "a list of 'exceptions,' whatever does not follow from general principles. These principles fall into two categories: those of UG and those of a specific language" (Chomsky 1995:235). This is the traditional view of the lexicon as the repository of idiosyncrasies. Information about a lexical item that is predictable from general principles is not part of a lexical entry. The unpredictable or idiosyncratic properties in a lexical entry include Saussurean arbitrariness, that is the arbitrary sound-meaning relationship associated with a linguistic sign. For example, the lexical entry for *wood* will include the unpredictable information about its pronunciation /wʊd/. However, the lexical entry will not include the phonetic information that the vowel is lengthened (in comparison, say, to the vowel of *book* /bʊk/) since it is a general principle of English phonology that vowels are lengthened before voiced consonants. Similarly, the lexical entry for the word *book* would not include the semantic information that it can refer to both a concrete and an abstract entity (as in *The book that I am writing will be long*) if, as Chomsky suggests, this is a universal property of nouns (1995:236).

In addition to its phonological and semantic content, a lexical entry is described by Chomsky as including the categorial feature of the lexical item, N (noun) in the case of *wood* or *book*. The categorial feature is an intrinsic formal feature which determines the range of optional formal features a lexical item may have. The category N, for example, permits features such as [plural] and [accusative] but prohibits features such as [past]. Most formal features other than category, such as case and number, depend on the particular occurrence of a noun in a linguistic expression and are not specified in the lexical

entry (1995:236). However, some formal features associated with category are not optional. In languages like Spanish, grammatical gender is an unpredictable, intrinsic formal feature of nouns, so the lexical entries for *madera* 'wood' and *libro* 'book' must specify the features [feminine] and [masculine], respectively. For nouns, then, formal features like case and number are considered optional features, acquired in the transition to the numeration, and grammatical gender is considered intrinsic, specified in the lexical entry.

Furthermore, some intrinsic features of lexical items follow from their semantic content. Chomsky suggests the possiblity that even the categorial feature of a lexical item (e. g., [N] for nouns) might be entailed by the semantic content of the lexical entry (1995:236; see also p. 32). Nevertheless, he tends to treat the categorial feature as an independent part of its lexical entry. He does, however, maintain that selectional properties of a verb, "insofar as they are determined by semantic properties, whether by UG or by specific rules of English, . . . will not be listed in the lexicon" (1995:238). As for the case assigning feature of a verb, Chomsky describes it as an intrinsic feature which is either determined by the semantic content of the lexical entry or listed as idiosyncratic (1995:238). In short, any formal features which are entailed by the categorial and/or semantic content of a lexical entry will not be independently marked or listed; only those features which are idiosyncratic or unpredictable will be.

However, not all members of a category are capable of taking on the optional features normally associated with that category. For example, a "defective" verb such as Spanish *soler* 'to be used to (doing something)' cannot be conjugated in the simple past tense and so cannot take the optional formal feature associated with this morphology. Another example in English might be a noncountable noun such as *furniture* which cannot pluralize (see discussion in Section 3.1 below). Exceptional properties such as these are not discussed in *The Minimalist Program*, perhaps because they follow from semantic features and so would not be marked independently in a lexical entry. Nevertheless, since

they are exceptions and since they ultimately affect the feature checking process, it follows that they must somehow be encoded in the lexicon. One example illustrating exceptional lexical properties that is mentioned, however, is the English copula *be*. Since the phonological form of this lexical item is unpredictable, Chomsky suggests that its lexical entry includes "a list of alternants" specifying the phonological matrix associated with different optional formal features (person, number, tense, etc.) (1995:239).

To summarize the discussion so far, a lexical entry is an economical listing of the exceptional and idiosyncratic features of a lexical item. All lexical entries contain the arbitrary pairing of phonological and semantic properties that constitutes a linguistic sign. In addition, the category designation of a lexical item is also considered part of its lexical entry. Features of a lexical item that follow from universal or language-specific principles are not listed in the lexical entry. Furthermore, there is no independent listing of any features that are already entailed by the semantic properties or the categorial feature of a lexical item.

Another aspect of the Minimalist lexicon is that it provides an "optimal coding" of the idiosyncratic or unpredictable information about lexical items. According to Chomsky, the coding of information in a lexical entry is optimal if it "just suffices to yield the LF representation and . . . allows the phonological component to construct the PF representation" (1995:235). This crucial aspect of the Minimalist lexicon suggests that the lexicon is the source of all information that drives the computational system. In other words, a lexical entry contains all the intrinsic features of a lexical item and determines the range of optional features that can be acquired in the transition to the numeration. In this respect, Minimalism takes a strong lexicalist stance. However, there is no suggestion anywhere in *The Minimalist Program* that features of a lexical item can be acquired through computational processes occurring in the lexicon. Basically, the Minimalist lexicon is just a list.

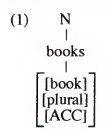
2.2. Morphology

If the lexicon is just a list, the implication is that the regular and productive formation of complex words takes place in the computational system. However, if all the morphological features necessary to drive the computational system are available at the input, the implication is that word formation takes place in the lexicon or in the transition to the numeration. One solution to this contradictory view of morphology is available in the postulation of a morphological subcomponent of the computational system, specifically a subcomponent of PF. Along with the morphological subcomponent of PF, a parallel subcomponent of LF called Word Interpretation is proposed to account for the interpretability of complex words formed in the computational system. These subcomponents are described below, followed by a brief discussion of an alternative approach, that of Distributed Morphology.

2.2.1. The morphological subcomponent

Chomsky describes a derivation as entering the morphological subcomponent immediately after spellout (1995:229). Operations of the morphological subcomponent include the linear ordering of morphemes (1995:334-337) and the application of morphophonemic rules. However, as has been noted, in Minimalism items enter the computational system with morphological features intact. I conclude from this apparent inconsistency that when lexical items enter the computational system, they enter with unordered featural sublabels or subsegments. In other words, the numeration consists of an array of feature bundles.

For example, in a sentence such as *Martha writes books*, the word *books* would enter the computational system as schematized below:

(1)


The formal notation *N* is the category label and represents the X^0 level in a syntactic structure. The notation *books* is an informal notation representing the bundle of features of the sublabels. The sublabel [book] represents the intrinsic semantic and phonological features of the lexical item, whereas the sublabels [plural] and [ACC] represent formal features, which in this case are also optional, acquired in the numeration. Both [book] and [plural] have phonological content, /bʊk/ and /z/, respectively. On a Minimalist view these phonological features would be "stripped away" at spellout and would enter the morphological subcomponent where they would be arranged in linear order, and the morphophonemic rule of devoicing would apply to the plural morpheme. However, since the case feature [ACC] has no phonological content in English, it does not need to enter the phonological component nor its morphological subcomponent.[2] The feature [ACC], along with the sublabels [plural] and [book] now lacking phonological content, will remain in the computation to LF where they will be available for covert feature checking operations.

Since optional features are acquired in the transition to the numeration, and since interpretable features do not have to be checked, one remaining problem is how to bar a sentence such as **Martha writes book*, where the optional interpretable feature [plural] was not acquired in the transition of the lexical item *book* to the numeration. A likely solution to this problem would involve the functional category D (Determiner). Although a detailed discussion of the DP Hypothesis is beyond the scope of this paper, I will assume that the optional interpretable features of a noun must be licensed by DP (cf. Abney 1987). For my purposes, this implies that a noun with optional interpretable features such as [±plural] must be embedded in a determiner phrase; otherwise the derivation will crash.

In short, then, the morphological subcomponent as described in *The Minimalist Program* is not a word formation component of the grammar, but is the locus of operations on the morphophonological features of words or wordlike elements, that is everything below the X^0 level. One question raised by this view of syntactic terminals as feature

bundles is the lexical status of affixes. For example, does the feature [plural] discussed in the previous paragraph represent a lexical entry? This question is addressed nowhere in *The Minimalist Program*.[3] However, it seems that the answer should be yes: this interpretable feature represents an arbitrary pairing of sound and meaning, and it has a categorial designation, just like the lexical entries of words described above (Section 2.1.2). In my view, then, the morphemes associated with optional formal features such as [plural] and [past] have lexical entries with the status of optional sublabels. But what about the feature [ACC] in (1)? It has no phonological content in modern English, and being a noninterpretable feature it must be considered meaningless. It seems to me, then, that in English at any rate the case feature should have no lexical entry. In short, I view the process that forms the numeration as involving two types of optional features—those like English [plural] which have lexical entries, and those like English case features which generally have no lexical entries.[4]

2.2.2. Word interpretation

Chomsky also proposes a covert analogue of the morphological subcomponent called word interpretation:

(2) At LF, X^0 is submitted to independent word interpretation processes WI. (1995:322)

The word interpretation subcomponent of LF is postulated specifically to account for words formed by incorporation. Basically it provides a mechanism for the segments of a complex X^0 element to be interpreted by the position of their traces. This implies that the process of incorporation in word formation—including the process involved in formation of zero verbs—is an operation of the computational system, not the lexicon. It also implies that the traces left by incorporation are not deleted, but remain visible at the output in order to satisfy Full Interpretation.

2.2.3. Distributed Morphology

Another view of the morphological subcomponent is provided in the Distributed Morphology framework proposed by Halle and Marantz (1993, 1994; see also Halle 1997). Distributed Morphology maintains that the computational system is responsible for assembling complex words as well as syntactic phrases. In short, Distributed Morphology is consistent with the view taken here that there are no computational processes in the lexicon and that the input to the computational system consists of feature bundles. Under the framework of Distributed Morphology, the computation from N → LF operates on formal features, as in the Minimalist framework. However, the Distributed Morphology lexicon is explicitly a list of underived vocabulary items (morphemes), not a list of derived or inflected forms. The lexical entry of each vocabulary item includes a phonological matrix, intrinsic features, and a specification of its licensing environment. The association of vocabulary items with terminal nodes of a syntactic expression occurs at spellout in what is known as *late insertion*. Late insertion matches features of the terminal nodes (including all the segments of a complex X^0) with features specified in the lexical entries of vocabulary items. Late insertion also involves access to the local environment to ensure that vocabulary items are properly licensed. Vocabulary items compete for insertion, with the most highly specified items taking precedence and the least specified having default, or "elsewhere," status.

The idea that vocabulary items may be underspecified for formal features or licensing environment is one aspect of Distributed Morphology that distinguishes it from Minimalism. Another distinction between the two approaches is that in Distributed Morphology functional and lexical vocabulary items are treated uniformly, whereas in Minimalism functional categories have a special status in terms of feature checking (Halle & Marantz 1993:169-170). However, there have been attempts in more recent literature to reconcile this distinction between the two theories (see Harley & Noyer 1998, Marantz 1999).

3. Remaining Issues: Lexical Entries and Categories

The view of the lexicon sketched above is essentially a summary of Chomsky's explicit description of what a lexical entry contains. Nevertheless, a few questions about the makeup of the Minimalist lexicon remain to be addressed before it will be possible to reconcile Hale and Keyser's syntactic approach to word formation with Chomsky's description of the lexicon as a list of idiosyncrasies. One of the issues to be discussed in this section is the characterization of a lexical entry as an optimal coding of exceptional information about lexical items. Related to this issue is a question about how many lexical entries a lexical item can or should have. Moreover, in the preceding description of the lexicon there is little mention of the functional categories that figure so prominently in the computational system and no mention at all of the abstract categories that are essential to Hale and Keyser's analysis of zero verbs.

3.1. Optimal Coding

One key aspect of the Minimalist lexicon is that it provides an optimal coding of the idiosyncratic or unpredictable information about lexical items. According to Chomsky, the coding of information in a lexical entry is optimal if it "just suffices to yield the LF representation and . . . allows the phonological component to construct the PF representation" (1995:235). In short, the lexical entry contains all the information about a lexical item necessary to drive the computational system. However, this definition must be taken together with the view, assumed throughout *The Minimalist Program*, that a linguistic expression can reach the output of LF with all formal features checked and still be nonsense (1995:194). In other words, "derivations [of linguistic expressions] are driven by the narrow mechanical requirement of feature checking only, not by a 'search for intelligibility' or the like" (1995:201). Now, if an optimally coded lexical entry just suffices to yield an LF representation, and if an LF representation can be nonsensical, it is extremely difficult to determine exactly how much information a lexical entry must specify.

This problem is complicated by the view taken above that lexical entries are economical; that is, they do not specify information that is entailed in the semantic content. Thus, another way of describing this problem is in terms of input and output: Which aspects of meaning determine the features possible at the input to the computational system, and which aspects of meaning are evaluated by the C-I system at the output?

Consider, for example, the lexical item *furniture*. Suppose its optimal lexical entry specifies its category N along with its pronunciation /fɅrnətʃər/ and meaning [furniture]. There are two possible approaches to explain a sentence like

(3) The furnitures are expensive.

Note that in terms of formal features (subject-verb agreement) this sentence converges. What is wrong with it then? First, we might consider such a sentence grammatically impossible if the lexical entry of *furniture* specifies an idiosyncratic feature, say [–plural], that prohibits its occurrence in collocation with the feature [+plural]. This would mean that in the transition to the numeration the optional feature [+plural] could not be associated with the lexical item *furniture*. On this approach, *furnitures* would never enter the computational system, and (3) would never be generated. On the other hand, we might say that the lexical entry of *furniture* specifies nothing about the feature [±plural]. The category label N would indicate that *furniture* can optionally be plural. Thus, a sentence like (3) could reach LF as a legitimate linguistic expression of English, with all formal features checked. However, when this sentence is evaluated by the C-I system, it would be found defective if the meaning of *furniture* is conceptually inconsistent with the meaning of [plural]. In other words, the answer to the question—is (3) ungrammatical or is it nonsense?—depends entirely upon how much information is specified in the lexical entry.

On an optimal view of lexical entries, there would be no need to specify [–plural] in the lexical entry of *furniture* or similar words. Even without this feature specification, the computational system can generate a convergent expression, and that is the key criterion for evaluating the optimality of a lexical entry. For a noun like *furniture*, it hardly matters

whether the determination of the feature is made at the input by lexical specification or at the output by conceptual compatibility. However, the question of optimal lexical entries is even more difficult when applied to verbs which have alternate argument structures and case assigning properties. This is the issue to which I now turn.

3.2. Multiple Lexical Entries

As previously described, the Minimalist lexicon is an economical listing of idiosyncrasies, eschewing redundancies that would result from specifying features which are already entailed by the semantic content of a lexical entry. The difficulty with this economical view of the lexicon is that in Minimalism there is also an imperative to reduce redundancy in the computational system. However, as redundancy is eliminated from the computational system—by dispensing with the deep structure level, for example—it seems that the lexicon has to bear a greater burden. For example, while the description of the lexicon outlined in Section 2 gives the impression that each lexical item has one lexical entry, this is not the view Chomsky ultimately takes.

The question of whether a lexical item can have more than one lexical entry arises with verbs that have varying selectional features associated with distinct formal features. Recall that selectional features are not explicitly listed in a lexical entry "insofar as these are determined by semantic properties" (Chomsky 1995:238). Suppose, however, that the semantic properties of a particular verb do not provide an unambiguous determination of its selectional features and also that the selectional features of the verb determine its case assigning properties. Will such a verb require a distinct lexical entry for each selectional context in which it may occur? Chomsky comes to the conclusion that a verb such as *want*, for example, must have two lexical entries: one with a case assigning feature which selects a nominal complement, and one without the case assigning feature which selects an infinitival complement (1995:308). This conclusion is based on the definition of lexical entries as optimal and has to do with the overall process of feature checking. Under

Minimalist principles, if a noninterpretable formal feature like the case of a noun is not checked in the checking domain of a verb with a matching case assigning feature, the derivation crashes. The only way to ensure that the case feature of a noun is properly checked is to also ensure that the case assigning feature of the verb is unambiguously specified. This suggests, then, that optimally the verb in (4a) has a different lexical entry than the verb in (4b).

(4) a. I want pizza

b. I want to eat (pizza)

c. I want him to eat (pizza)

In discussing this problem, Chomsky does not mention PRO (the phonologically null subject of the verb *to eat* in (4b)), nor does he mention Exceptional Case Marking (ECM) verbs like *want* in (4c). Sentences (4a) and (4c) are alike in that both *pizza* and *him* have accusative case, so according to the reasoning above the main verb in both of these sentences would be of the lexical entry for *want* that contains the case assigning feature. However, sentences (4a) and (4c) are different in that the main verb in (4c) selects an infinitival complement, more like the verb *want* in (4b). Does this mean that there are really *three* lexical entries for the verb *want*—one without a case assigning feature, one with [assign ACC], and one with both [assign ACC] and [ECM] features? Such a view would suggest that selectional features (or at least a feature like [ECM] which is associated with selectional properties) are formal features, contrary to what is implied in *The Minimalist Program*. At any rate, it is evident that the case assigning feature alone cannot account for the selectional properties of verbs.

A similar question can be raised about the verb *eat* in sentences (4b) and (4c). As indicated by parentheses, the direct object of *eat* is optional. Does this mean that there are two lexical entries for *eat*, as for *want* ? Chomsky determines that the answer is yes: "verbs with optional objects will have distinct lexical entries, one with and one without the Case feature" (1995:308). The situation for *eat* is slightly different from that of *want*,

however, since the option of having no direct object with *eat* is only possible so long as an object consistent with the meaning of *eat* can be tacitly interpreted. For example, while it is possible in English to say *Last night he ate his words*, it is impossible to express the same meaning with the sentence *Last night he ate*. The latter can only be interpreted as meaning *Last night he ate [something edible]*. In other words, the optionality of the direct object is inherent to the semantics of the verb. This being the case, it seems intuitively wrong to postulate separate lexical entries for the case assigning and non-case assigning versions of *eat*, since they both must have the same semantic content.

To summarize, if there are two (or more) lexical entries for verbs like *want* (and possibly for verbs like *eat*), we are then faced with the task of determining how the various lexical entries of a specific word are related to each other. This is the problem Hale and Keyser have addressed with their dual syntax, although they use as their starting point argument structure alternations rather than case assigning properties. Chomsky, however, mentions that Hale and Keyser's distinction between l-syntax and s-syntax does not seem necessary (1995:214, fn. 18). If there is no computational system in the lexicon, then one logical solution is multiple entries for certain lexical items. Basically, the problem arises because, in eliminating redundancy from the computational system (e. g., dispensing with deep structure), there has been a concomitant increase in redundancy in the lexicon. This uneconomical view of the lexicon, however, seems to fly in the face of the economy principles which are intrinsic to the Minimalist program.

Taking an economical view, we would not want the Minimalist lexicon to contain two or more full lexical entries for the same word, particularly if the lexical entries differ only on the basis of one or two formal features. For this reason, I reject Chomsky's suggestion that verbs like *want* must have more than one lexical entry. An alternative solution would be for the lexical entry of such verbs to specify the range of alternative case assigning features that can be acquired in the transition to the numeration. A similar

approach, along the lines of Distributed Morphology, would involve underspecification of features in the lexical entry (cf. Harley & Noyer 1998).

Chomsky states that the case assigning feature of a verb is intrinsic, either determined by its semantic properties or listed as idiosyncratic (1995:238). However, as is evident from the foregoing discussion, it is not unusual for a verb to have alternative case assigning features. Part of a speaker's lexical knowledge of verbs is knowing which case assigning features they may have. In the approach that I am suggesting, if a verb has more than one alternative for this feature, these alternatives are encoded in the lexical entry of the verb. It does not seem necessary for a verb to have multiple lexical entries in order to encode this knowledge.

3.3. Functional Categories

Another problem in describing the lexicon in accordance with Minimalist concepts has to do with functional categories. It is difficult to assess the lexical status of functional categories in the Minimalist framework. Traditionally, the terms *lexical* and *functional* have been defined as complementary. Those items classed as lexical are members of the open-class categories, Noun, Verb, Adjective, Adverb, and Preposition (however, whether Preposition is included in this group is a matter of debate (see e. g., Beard 1995)). Those items classed as functional are members of the closed-class categories (e. g., auxiliaries, pronouns, articles, complementizers, and inflectional morphemes). In this traditional view, elements of both lexical and functional categories are items of the lexicon.

In Minimalism, however, there are just three functional categories, C (Complementizer), T (Tense), and D (Determiner), which basically serve as targets for movement.[5] This means that they are essential for the feature checking process, which in turn is the function of the computational system: features of a lexical element can be checked if they are in the checking domain of a functional element. For example, the functional category CP (complementizer phrase) can serve as the target for movement of an

NP in the derivation of a WH-question. When an element moves to a functional category to have a feature (or features) checked, it enters the checking domain of the head of the functional category. If the features of the functional head are matched by features of the moved element, then those features are "checked." It appears, in fact, that features can *only* be checked in this way. If so, this is the defining characteristic of functional categories: a category is a functional category if it serves as a target for movement in the feature checking process. To my knowledge, however, this is not stated explicitly in *The Minimalist Program*. However, it is consistent with the characterization of the operation Move as "Attract" (see Chomsky 1995:297 ff).

One distinction made in *The Minimalist Program* between lexical and functional categories involves the terms *substantive* and *nonsubstantive*. Elements in the categories N, V, A, and P are referred to as having substantive content, whereas members of the functional categories have nonsubstantive content (Chomsky 1995:54). Beyond this, no explicit definition of the term substantive is provided. It is clear, however, that it does not refer to semantic substance, since the functional categories T, D, C are said to have semantic properties (1995:240). It is also apparent that the term substantive does not refer to phonological substance since the empty category PRO, for example, is treated as a member of the substantive category N (1995:35). On the other hand, the phonologically null light verb *v* is labeled a nonsubstantive category (1995:368), suggesting that it is distinct from the category V, but leaving unresolved the status of overt light verbs. I will return to the lexical status of phonologically null items below, merely noting here the unresolved vagueness of the term substantive as used in *The Minimalist Program*.

It is not explicitly stated in *The Minimalist Program* how functional categories get into the computational system. Are they drawn from the lexicon or are they inherent to the computational system? I assume that they are drawn from the lexicon, based on the following reasoning as suggested by Chomsky's brief discussion of the question (1995:240). Each member of a functional category, like members of the lexical categories,

can have intrinsic and/or optional features. For example, the category C (Complementizer) has a declarative member, the word *that*, which may optionally be phonologically null. This category also has an interrogative member which is involved in the feature checking operations that result in WH-movement. The distinction between the declarative and interrogative members of the category C suggests that this category has at least two lexical entries with different intrinsic features. Another functional category that can have optional features is Tense (T). This category serves as the checking domain for the optional person, number, tense, and other formal features of a finite verb. Since functional categories may have optional features, it implies that functional categories are selected from the numeration. Additionally, since functional categories may have distinct members with different intrinsic features (e. g., the interrogative and declarative members of C), it implies that they have lexical entries.

3.4. Abstract Categories

Another issue that arises in defining the Minimalist lexicon is the status of abstract categories. This issue has direct relevance to the process of deriving zero verbs under the approach developed by Hale and Keyser (1993, 1997, 1998). I use the term abstract categories in referring to lexical categories which are phonologically null, specifically to the *v*, V, and P heads involved in the derivation of zero verbs (see (11) below). However, in this section I will distinguish abstract categories from empty categories—another term used in the literature in reference to lexical (N, V, A, P) terminals without phonological content. My definition of abstract categories also suggests a distinction from the functional categories discussed above (Complementizer, Determiner, Tense). However, the distinction seems to be somewhat superficial, at least in a Minimalist framework. Both abstract and functional categories serve as targets for movement in the computational system. The purpose of the functional categories is to provide sites for feature checking. And since the operation Move occurs for the purpose of checking features on the moved

item, it would follow that abstract lexical categories, too, must serve a feature checking function. Nevertheless, it is difficult to determine what, if any, features are to be checked by movement into an abstract lexical category. The only abstract category discussed in *The Minimalist Program* is the phonologically null light verb *v*, the matrix verb in a VP shell construction. Chomsky has suggested that for *v*, the checked feature is affixal (1995:269). The identification of a formal affixal feature raises the additional question of how—or whether—the feature is encoded in lexical entries. Furthermore, there are serious questions about the theoretical status of abstract categories, and criticisms have been raised in the literature about the proliferation of their use as a theoretical tool.

3.4.1. Types of empty categories

Chomsky identifies four main types of empty categories (1995:35-43, summarized from earlier work). One is the empty pronominal, PRO ("big PRO"), which is coindexed with the subject of its controlling verb as in:

(5) Mary$_i$ likes PRO$_i$ to eat pizza
Mary$_i$ enjoys PRO$_i$ eating pizza

Control verbs such as *like* and *enjoy* have complement phrases in which the empty subject of the nonfinite verb (*to eat, eating*) is understood as the matrix subject. Another empty pronominal category, *pro* ("little pro"), is licensed by the strong inflectional system of certain languages like Spanish.

(6) *pro* habl-o español 'I speak Spanish'
pro habl-an español 'They speak Spanish'

Little *pro* is the subject of a finite verb in contrast to the controlled PRO in (5). Another difference between them is that PRO requires a local antecedent, whereas *pro* does not.[6]

A third empty category identified by Chomsky is *trace*. A trace is not a lexical item like the empty pronominals, but is created in the computational system as a result of movement. There are basically two types of trace, NP-trace and WH-trace. An NP-trace results from movement of a noun phrase, as in

(7) [e] seems John to like pizza → John$_i$ seems t$_i$ to like pizza

We know that *seem* is not a control verb because it can occur with a finite complement phrase, while control verbs cannot:

(8) It seems John likes pizza
*It likes John eats pizza

The WH-trace results from movement in the formation of a question (or relative clause):

(9) [e] did you eat what → what$_i$ did you eat t$_i$

Both NP-traces and WH-traces function as place holders in syntax. Their existence prevents another constituent from occurring in that spot:

(10) a. John seems **t** to like pizza
*John seems **he** to like pizza

b. What did you eat **t**
*What did you eat **it**

The pronouns *he* (10a) and *it* (10b) are vacuous constituents which violate the Full Interpretation (FI) condition at LF. The foregoing examples indicate that both traces and phonologically null pronominals can be accounted for on the basis of concrete linguistic evidence. PRO and *pro* have semantic content and are interpretable at the LF interface. Traces function as place holders preventing the occurrence of vacuous constituents.

The fourth type of empty category identified by Chomsky has theory-internal justification. It is the target of movement (for example, the positions represented as [e] in (7) and (9) above), having only categorial features. Chomsky further explains, "since these elements have no semantic role, they will not satisfy the condition FI . . ., and we may tentatively assume that they and the structures projected from them are inserted in the course of derivation, in a manner permitted by the theory of phrase structure" (1995:40). At first glance, it seems natural for this type of empty category to include, among other elements, the phonologically null *v* (light verb) in the VP shell structure. However, there are some differences. First, the empty categories which are targets of NP movement (7) and WH-movement (9) are maximal categories; they are specifiers filled by the process of

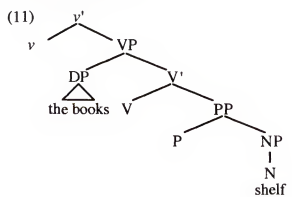
substitution. On the other hand, movement of an overt verb, for example, to the position of the phonologically null light verb in a VP shell is a process of adjunction involving head movement only. Second, having "no semantic role" means that the fourth type of empty category identified by Chomsky neither assigns a theta role nor has one assigned to it. On the other hand, the light verb in a VP shell exists in part to provide enough theta positions for each of the arguments of a triadic verb (1995:315; see Larson 1988).

Thus, I would argue that the light verb in a VP shell, as well as the phonologically null V and P heads involved in the derivation of zero verbs, represent a fifth type of empty category, called abstract categories. The abstract categories are different from other targets of movement in that (a) they are targets of head movement only, and (b) they may—and perhaps must—have semantic content to the extent that they are involved in thematic role assignment. A third difference might also be that adjunction to abstract lexical heads is not a feature checking operation as is movement to a specifier position in functional categories. Adjunction to an abstract category should be a requirement of Full Interpretation, since at the PF interface an abstract category will be vacuous and hence uninterpretable.

3.4.2. The affixal feature

Following Hale and Keyser (1993, 1997, 1998) I assume an analysis of zero verbs involving incorporation of an overt noun into abstract categories on a Larsonian VP shell structure as illustrated below:

(11)



This structure is identical to the VP shell structure proposed by Larson (1988) for triadic verbs such as *put* (see also Chomsky 1995:180). The main difference between the two is that for the verb *put*, the V and P heads are not abstract, but contain lexical entries *put* and *on*, respectively. In both cases, however, V incorporates with the abstract light verb *v* in deriving the expressions.

The movement of V to *v* raises the question: What feature is being checked that results in movement? The answer offered in *The Minimalist Program* is the feature [affix]. It is suggested, for example, that noun incorporation is licensed by the feature [affix] on the noun, a noninterpretable feature (1995:285). In the VP shell, we are talking about verb incorporation. In Chomsky's proposal *v* has the intrinsic formal feature [–verbal] meaning that it "requires a verbal affix,"[7] and V has the feature [affix], licensing incorporation. V will then raise to have its affixal feature checked and matched with the [–verbal] feature of *v* (1995:269, 321). It is necessary to stipulate that the [–verbal] feature is strong in order to ensure that movement occurs before spellout (1995:260).

Other refinements of the approach just described might also be necessary. We can assume that for triadic verbs the feature [affix] on V is intrinsic, whereas for nouns undergoing incorporation in zero verb formation, for example, it would be optional. For the derivation of zero verbs, the use of affixal features would be more complicated, since the base noun (*shelf* in (11)) incorporates with three abstract heads. Consequently each of the three abstract categories would require affixal features. In the example of *shelve* (11), *v* would have the feature [–verbal] meaning that it takes a verbal affix; V would have the feature [affix] which would be matched with the [–verbal] feature of *v* after raising. V would also need to have the feature [–prepositional] to indicate that it takes a prepositional affix, licensing incorporation of the abstract P. In turn, the abstract P would have the features [affix] and [–nominal], to license incorporation of the base noun. And finally, the N *shelf* would have the optional feature [affix] along with its categorial, semantic and phonological features. During the incorporation process, all the affixal features just

described on N, P, V and *v* would be deleted once checked since they are noninterpretable features.

The process just described is highly inefficient and redundant. A simpler approach, as mentioned above, would rely on the concept of Full Interpretation at the PF interface. I propose a rule to the effect that incorporation with an abstract category—distinct from a functional category, as defined above—must occur before spellout. If not, the derivation would crash in the phonological component. In essence, this means that abstract categories are affixal by definition. In a similar vein, Hale and Keyser have suggested that the process of incorporation involved in the derivation of zero verbs is "a concomitant of Merge" (1998:86). In short, incorporation with an abstract category occurs automatically, and not as a result of feature checking.

3.4.3. Semantic deconstruction

Hale and Keyser based their proposal for the derivation of zero verbs in part on an assumption of the universality of lexical categories (N, V, A, P) each identified with a particular "notional" type: V is associated with the notional type "(dynamic) event," P with the notional type "interrelation," and N with the notional type "entity" (1993:71). Thus, Hale and Keyser's approach may be viewed as a kind of semantic deconstruction, with the abstract V and P categories involved in the derivation of zero verbs representing notional types and nothing more.[8] Hale and Keyser maintain that it is the structural configuration in which these categories occur that determines the semantic relations between them. The fact that these categories may be abstract, or phonologically null, should add no burden to the computational system as long as there are principled constraints on the structural configuration and on the movement of elements in the derivation. In fact, Hale and Keyser develop a convincing account for the derivation of zero verbs under the same constraints that operate in the syntax generally. (See Chapter 3 for a detailed discussion of Hale and Keyser's approach.) Nevertheless, because of the semantic deconstruction aspects of their

approach, it may be susceptible to criticism of the type that was lodged against the Generative Semantics movement in the 1970s—a reliance on unanalyzable abstract elements results in a theory that is too powerful, leading to overgeneration. In short, there seems to be no limit to the syntactic structures that could be generated merely by postulating an abstract category here and there. In this section, I will review some of the criticisms of, and rationales for, the use of abstract categories in syntax.

Although Hale and Keyser's configurational approach seems to involve semantic deconstruction, it avoids the overgeneration problems associated with Generative Semantics because their approach is based on a restrictive theory of phrase structure and principled constraints on movement. Specifically, their approach is restricted by the assumption of binary branching in X-bar theory (see Kayne 1984) and constraints on head movement in incorporation theory (see Baker 1988). These are virtually the same assumptions relied upon by Larson (1988) in his proposal of the VP shell structure in solving the dative/double object alternation. Jackendoff criticized Larson's VP shell proposal for introducing "a great deal of structure that is not evident from the surface of the dative construction" (1990a:453). Jackendoff refers to this approach as Abstract Syntax:

> Both Larson and the abstract syntacticians assume a simple, rigid relationship between syntax and semantics: where Larson appeals to UTAH, Abstract Syntax appealed to the Katz-Postal (1964) Hypothesis that all meaning distinctions are represented in deep structure. This was a significant and compelling constraint on the theory of grammar, and it became a cornerstone of the Standard Theory (Chomsky 1965); but it proved to be false. . . . Abstract Syntax failed not so much because of a lack of constraints, but rather because its constraints were too rigid to account for facts of lexical variation, lexical generalization, and surface syntactic distribution. (1990a: 453-454)

A response to this criticism comes from Den Dikken (1995) who points out that a restrictive X-bar theory is the cornerstone of the Principles and Parameters framework since it is by restricting the generative component that the rapidity of language acquisition can be accounted for. In Den Dikken's view,

> The burden of proof in matters of syntactic structure hence *a priori* resides with those who advocate more-than-binary branching structures. . . . Small

> clauses [i. e., embedded predicative structures like VP shell], then, are available at no cost whatsoever. The same goes for abstract syntactic structure, and the *decomposition* of apparently atomic lexical items into two or more syntactic heads. . . . In each case of abstract syntactic structure, the concrete surface result is obtained via the amalgamation of the various (abstract or, in part, concrete) heads through the application of *head incorporation*. The postulation of abstract structures, then, is constrained by the theory of head movement. Only if an abstract underlying structure can be turned into the appropriate surface output via legitimate applications of Move α can this abstract, decomposed structure be adopted. (1995:28, italics original)

In fact, the postulation of abstract categories in recent studies of syntactic structure tends to go hand in hand with binary branching assumptions and other restrictive conditions on syntactic processes. Kayne (1984), for example, postulated an abstract P in order to achieve a binary branching structure for the double object construction (as well as to account for case assignment). Larson (1988) expanded on Kayne's binary branching approach by postulating an abstract matrix verb (now formalized as the light verb *v*) in order to account for the asymmetrical c-command relationships in triadic constructions. Since Larson, the VP shell has been widely accepted, and in some cases expanded with multiple abstract verbs (see, e. g., Fujita 1994, 1996). In short, the use of abstract categories in syntactic analysis is accepted as long as it serves the goal of maintaining a restrictive view of the generative component (i. e., the computational system).

Hale and Keyser have adapted the use of abstract P and V categories in syntax to the analysis of lexical argument structure and the derivation of zero verbs. However, they are not alone in postulating abstract categories as word formation elements. Essentially the same approach to category conversion was taken by Walinska de Hackbeil with a slightly less restrictive phrase structure grammar (1986). Miller proposed an abstract Adjective category for the derivation of passive adjectives (1993:24). These analyses of category conversion are based on the assumption that certain word formation processes are subject to the same principles that restrict syntactic structure and movement (e. g., Empty Category

Principle, Head Movement Constraint, Theta Criterion, X-bar theory, etc.; see discussion in Chapter 3 below).

A slightly different approach to abstract categories is developed by Pesetsky (1995), who goes to some length to show that abstract structure *is* evident from the surface, in contrast to Jackendoff's criticism of Larson. Pesetsky proposes three phonologically null affixes (including [CAUS], somewhat similar to the abstract light verb *v*) which are implicated in argument structure alternations. Moreover, they block further affixation, so there is morphological evidence for them. Although Pesetsky's analysis using phonologically null affixes has problems, they are not problems that extend to the overall concept of abstract categories. Fujita, for example, accounts for Pesetsky's data with a "proliferated" VP shell with three abstract V heads (1996). Pesetsky offers two reasons why a language learner would posit the existence of abstract categories (1995:213-214). One is the blocking effects noted above. The second is the existence of alternations in argument structure (e. g., dative shift, transitive/inchoative alternation). Given evidence like this, Pesetsky says,

> the finger of the Language Acquisition Device points to morphology. For verbs like *give*, UG somehow must dictate that Agent is the external argument of choice. This will lead the language learner to the presence of CAUS when a homophonous verb *give* selects a Causer rather than an Agent. (1995:213)

A similar argument can be made for the abstract categories involved in the derivation of zero verbs, whether they are called affixes or not (cf. Hale & Keyser 1998:112).

Whenever an innovation is introduced to a theoretical framework, it is likely to provoke criticism and spark the kind of debate that eventually strengthens the theory. Innovations like the VP shell and abstract categories now seem to have weathered the storm, having become standard assumptions in much recent literature. Since Larson's original proposal, others who have used abstract P and/or V categories in syntactic analysis are Baker (1988, 1996b), Den Dikken (1995), Fujita (1994, 1996), Harley and Noyer

(1998), Koizumi (1995), Li (1990), and Speas (1996), among others. Such widespread application of the proposals have strengthened their theoretical viability. The application of the VP shell and abstract categories to word formation, as with zero verbs, is relatively untested in the literature, however. Many issues remain to be resolved, such as what, if any, semantic content is associated with the abstract categories. This and other aspects of abstract categories and zero verb formation will be addressed in the following chapters.

4. The Minimalist Lexicon and Zero Verb Formation

The Minimalist lexicon is defined as a list of idiosyncrasies. I have assumed that there are no computational operations in the lexicon, since the lexicon serves as the input to the computational system. Lexical entries in the Minimalist lexicon are *economical*; that is, nothing is specified in a lexical entry that follows from universal or language-specific principles. All lexical entries contain the arbitrary pairing of sound and meaning that constitutes a linguistic sign, along with a designation of category. A further aspect of the economy of a lexical entry is that nothing is specified that is already entailed by the phonological, semantic, and/or categorial features that constitute the lexical entry.

In addition to being economical, lexical entries in the Minimalist lexicon are *optimal*; that is, "the lexical entry provides, once and for all, the information required for further computations . . ." (Chomsky 1995:239). Much of the semantic content of a lexical entry is not relevant to the computational system, but is evaluated at the output to the conceptual-intentional system. This means that it is always possible for the computational system to generate a convergent but meaningless linguistic expression. The information required for operations of the computational system ($N \rightarrow LF$) consists of formal features, some of which are intrinsic to a lexical item and others which are optional. Optional features are acquired in the transition to the numeration, and the range of optional features a lexical item may acquire is either determined by its categorial feature or, if idiosyncratic, specified in the lexical entry. Intrinsic formal features, on the other hand, are generally not acquired in the

transition to the numeration. However, there are some lexical items which permit a range of alternants for intrinsic formal features (e. g., the case assigning features of certain verbs). I have suggested that for these lexical items the range of alternants is specified in the lexical entry but that the choice of alternant is part of the formation of the numeration.

The view of the lexicon as just summarized provides few answers to questions about the formation of zero verbs. In this regard, I have drawn the following conclusions. First, the formation of zero verbs involves incorporation processes occurring in the computational system. Second, each of the abstract and overt lexical heads involved in the incorporation process is drawn from the lexicon. Finally, in the transition to the numeration they could theoretically acquire any (or none) of the optional features licensed by their category designation. The details remain to be worked out. I assume that the abstract verbs carry optional tense, agreement, and case assigning features which are acquired in the transition to the numeration and checked during the computation. Interpretable features such as [±plural] associated with nouns would have to be licensed by DP in order for the derivation to converge (see Section 2.2.1 above). As we will see in Chapter 3, there are general linguistic principles which prevent a DP with noun incorporation. Interpretable features associated with the abstract heads will be discussed as my analysis of zero verbs progresses. Among the issues remaining to be addressed in subsequent chapters are the selectional properties of the abstract categories, how to account for semantic relationships and distinctions between zero verbs and the nouns from which they are derived, and the status of the traces that result from incorporation.

Notes

1. Chomsky notes, in reference to a "pure" expletive like *there*, that the categorial feature of a lexical item with no semantic content may be considered [–Interpretable] since categorial features are interpretable by virtue of being implicated in the semantic content of a lexical item (1995:385, fn. 48).

2. Another approach would be to assume that the case feature does have a phonological realization, but that its default realization is null. With this approach, the feature [ACC] would enter the phonological component along with the other features.

3. In the discussion of lexical entries, however, there is a suggestion that the English past tense is listed in the lexicon (1995:240).

4. The possessive marker of English would be an exception to this generalization.

5. Actually, these are the three functional categories discussed in *The Minimalist Program*, along with Agr (Agreement), which is ultimately dispensed with. There appears to be nothing in theory ruling out the possibility of additional functional categories, though the number would be finite.

6. In certain cases PRO has no antecedent so it is interpreted as arbitrary:
   It's fun PRO_{arb} to eat pizza
   I recommend PRO_{arb} eating pizza

7. This feature is formalized as [–*v*] in Chomsky's explication (1995:269; see also p. 260). Note that the symbol "–" does *not* represent a negative value of a binary feature.

8. This is explicit in Hale and Keyser (1993), but they later suggest that there are two types of interrelation associated with the category P, namely "terminal coincidence" and "central coincidence" (1997:36).

CHAPTER 3
LEXICAL SYNTAX

1. Introduction

Hale and Keyser's work extends a long discussion in linguistic literature about the relationship between the meanings of words and the grammatical structures they occur in. The study of this relationship has focused on the question of how it is possible for speakers of a language to know, with very little evidence, which verbs do and do not undergo argument structure alternations. Investigations of this question have indicated that meaning alone does not determine the syntactic structures individual words can occur in. To a certain extent the structure also determines the meaning. As stated by Hale and Keyser,

> The fact that there is a high degree of cross-linguistic agreement in the classification of verbs—as basic transitive, basic intransitive, unaccusative, ergative, unergative, and so on—encourages the belief that the argument structure type of a verb can be predicted "from its meaning". While there is surely some truth in this . . ., its use is methodologically incorrect within the framework we are assuming here, not merely because meaning is slippery, a thin reed to lean on, but because we maintain that certain crucial aspects of meaning are dependent on the very *structural* features whose identification is at issue. If we "knew the meaning", we would know the structure, perforce, because we know the meaning *from* the structure. (1998:110, emphasis original)

Thus Hale and Keyser's focus in work over the last decade has been to formalize the way structure encodes meaning.

It is important to note that the formalization of this relationship has changed in Hale and Keyser's work over the years. To some extent the formal changes reflect a slight shift in their view of the relationship between the lexicon and syntax. It seems that this change is principally due to the influence of Minimalism, particularly the Minimalist idea that there is no internal interface between the lexicon and the syntax. My objective in this chapter is

to summarize in detail the development of Hale and Keyser's framework through four articles (1992, 1993, 1997, 1998). In Sections 2 through 4, I will discuss the main ideas that they have contributed to the literature on verbal argument structure which have remained relatively constant throughout. In Sections 5 and 6, I will then review some of the aspects of their framework which have been modified over time. Throughout this discussion, I will focus on the aspects of Hale and Keyser's work that are particularly relevant to my overall analysis of zero verbs, pointing out the features of their framework which I adopt as well as those which create gaps and conflicts to be resolved.

2. The Syntactic Nature of Argument Structure

The main contribution to the study of argument structure made by Hale and Keyser has been their view that the subcategorization properties of lexical items are not only structural, but also conform to the same structural principles holding in the syntax. In support of this view they have focused much of their research on zero-derived denominal and deadjectival verbs of English, using these derived verbs as evidence in support of their view of the syntactic nature of the lexical argument structures of all verbs (1993:53, 1997:34).

Hale and Keyser have assumed throughout their work that transitive denominal verbs (e. g., *to shelve*, *to saddle*), unergative denominal verbs (e. g., *to laugh*, *to dance*), and deadjectival verbs (e. g., *to clear*, *to thin*) are formed by a special process of incorporation. Incorporation is a syntactic process of head-to-head movement (Baker 1988, 1996b). Hale and Keyser use the term *conflation* to describe the special process of incorporation involved in the formation of denominal and deadjectival verbs. Conflation involves movement of phonologically overt lexical heads to governing lexical head positions with no phonological content. For example, movement of the lexical head of a noun phrase, *shelf*, into phonologically null P and V heads forms the transitive denominal verb *shelve* (see (4) below). Although Hale and Keyser have focused their discussion of

argument structure on derived verbs, they have proposed that non-derived verbs have the same lexical-structural representations as derived verbs with the same syntactic argument structures. They suggest, for example, that transitive verbs like *cut, break, crush*, etc., have a complex lexical argument structure closely related to that of the transitive denominal verbs *shelve* and *saddle* (1993:83-84). It is important to keep in mind, therefore, that Hale and Keyser are not developing a theory of verbal derivation, but rather they are using a particular view of verbal derivation as a point of departure for the development of a theory of the constraints on argument structure in general (1997:30).

2.1. Theoretical Constraints

The view that verbs such as *to shelve, to laugh*, and *to clear* are formed by a syntactic process implies that the derivation of such verbs obeys syntactic principles (Hale & Keyser 1997:31). To illustrate the syntactic nature of the derivations, Hale and Keyser use familiar X-bar diagrams which they alternately refer to as "lexical relational structures" (LRS) or "lexical argument structures" (LAS). I will refer to them as "conflation structures," however, temporarily setting aside the question of whether or not they are generated in the lexicon (see Section 6 below). One claim that has remained constant in Hale and Keyser's framework is that the derivation of denominal and deadjectival verbs is constrained by the syntactic principles of Unambiguous Projection and the Empty Category Principle.

(1) *Unambiguous Projection:*
Each lexical head X determines an unambiguous projection of its category—to a phrasal level, XP—and an unambiguous arrange- ment of its arguments, as specifier and complement. (Hale & Keyser 1993:66)

(2) *Empty Category Principle:*
An empty category must be properly governed. (Chomsky 1981:250)[1]

Hale and Keyser's principle of Unambiguous Projection is based on Kayne's discussion of Unambiguous Paths (1984) and Larson's Single Complement Hypothesis (1988) which entail binary branching and limit the levels of a phrasal category to two—the intermediate

(X′) and maximal (XP) projections. As a result, Hale and Keyser adopt the VP shell configuration (4) proposed by Larson (1988) for verbs with more than one internal argument. The ECP (2) requires that a moved item must antecedent-govern its trace. The ECP further entails a constraint on incorporation:

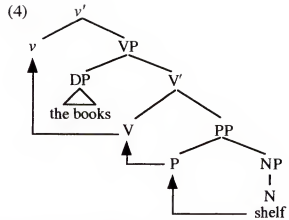
(3) *Head Movement Constraint:*
An X^0 may only move into the Y^0 that properly governs it. (Travis 1984:131; see also Baker 1988:51-68)[2]

This constraint limits incorporation to head-to-head movement, meaning that no head position can be skipped in the process and also that a specifier is barred from incorporating into a governing head position. A further constraint on incorporation that Hale and Keyser have adopted (1997:44-45) is that functional nodes cannot intervene between incorporated lexical heads (Li 1990:406, 423; see also Baker & Hale 1990). Consequently for the derivation of zero verbs, there can be no functional or inflectional heads between the two verbs in a VP shell structure. Together with the Head Movement Constraint, this constraint on functional nodes means that in the formation of denominal verbs only a bare NP complement ($NP=N^0$), not a determiner phrase (DP) or a case phrase (KP), may incorporate with the abstract lexical heads in the process of conflation.

2.2. Location and Locatum Verb Structures

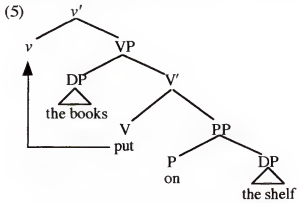
One consequence of these constraints for Hale and Keyser is that transitive zero verbs, regardless of their classification as Location or Locatum verbs, are derived on the same structure, with the most deeply embedded noun incorporating into abstract lexical heads. Their proposal for the conflation structure of the Location verb *shelve* is as follows (1993:57):[3]

(4)



This structure is comparable to the argument structure of a triadic verb such as *put*, which projects a VP shell structure to accommodate its two internal arguments (5). One difference is that the V and P heads of the zero derived Location verb (4) are phonologically null while those of a triadic verb (5) are overt (containing *put* and *in/on*, for example). The other basic difference is that in the conflation structure of a Location verb (4), the NP complement must consist of only a bare head (e. g., *shelf*) in order for incorporation to occur, while the other argument is a DP variable. However, in the argument structure of the triadic verb (5) both internal arguments are base generated DP variables.

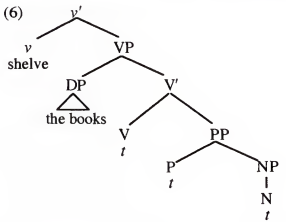
(5)



The structural similarity of (4) and (5) suggests a semantic similarity as well, such that in (4) the V and P heads in the lower VP are phonologically null versions of the V and P heads in (5), *put* and *on*, respectively. In other words, the result of incorporation in (4) is a transitive verb *shelve* having a basic meaning 'put the books on the shelf.'

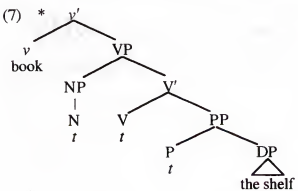
Location verbs like *shelve* are derived by the three-step process of incorporation shown in (4): the noun *shelf* first incorporates with the null preposition, then the combination *shelf*-P incorporates with the lower verb, and finally the resulting N-P-V complex incorporates with the upper *v* resulting in the structure shown in (6).[4]

(6)



Accordingly, the specifier of VP in (6) is the only internal argument position left available for insertion (or merger) of the DP variable after the derivation of the denominal verb. The DP represents the base generated direct object of the derived transitive verb. Another result of this analysis is that insertion is barred in the head positions occupied by traces after incorporation (discussed further in Chapter 6 below). Furthermore, because of the Head Movement Constraint, any noun in a specifier position is barred from incorporating. As a result, the structure in (4) cannot produce the derivation in (7).

(7) *

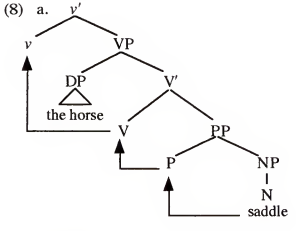


In other words, the proposed conflation structure (4) derives the Location verb in *shelve the books* meaning 'put books on the *shelf*,' and the Head Movement Constraint prohibits

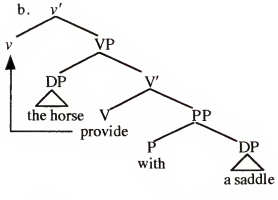
derivation (7) for the verb in **book the shelf* with the same meaning 'put *books* on the shelf.'

Hale and Keyser ingeniously propose an identical conflation structure for the derivation of Locatum verbs such as *saddle* (1992:131, 1993:62). Even though Locatum verbs are traditionally defined with a *put*-locution such as 'put the *saddle* on the horse,' they are not derived on a prohibited structure like (7) for **book the shelf*, 'put *books* on the shelf.' Instead Hale and Keyser compare the conflation structure of Locatum verbs like *saddle* (8a) to the structure of the triadic verb *provide* (8b). Thus, Locatum verbs not only have the same conflation structure as Location verbs but are derived by the same cyclic process of incorporation (compare (8a) to (4)).

(8) a.



b.



Since the process of incorporation is restricted to head-to-head movement, the only noun in (8a) which can incorporate is the PP complement (*saddle*), and any noun in a specifier position is barred from incorporating. In other words, the conflation structure in (4) and

(8a) accounts for the derivation of *shelve the books* or *saddle the horse* and makes **book the shelf* or **horse the saddle* impossible with the same readings.

To summarize the discussion so far, Hale and Keyser have remained constant in their view that denominal verbs like *shelve* and *saddle* are formed by the process of incorporation of phonologically overt lexical nodes with phonologically null lexical nodes in a structural configuration that conforms to recognized principles of syntax. Because the process of incorporation is syntactic and obeys syntactic constraints, the formation of zero verbs is not a simple matter of category conversion (Hale & Keyser 1993:59).[5] In other words, not just any noun can incorporate to form a denominal verb, but only the most deeply embedded argument in the VP shell structure. As a result of the constraint on head-to-head movement, the following sentences are impossible with the meanings given in parentheses (Hale & Keyser 1997:32):

(9) a. *We corraled the horses in[6]
(cf. We put the horses in a corral)

b. *She saddled her horse with
(cf. She provided her horse with a saddle)

c. *They wined into the bottles
(cf. They put wine into the bottles)

d. *They housed a coat of paint
(cf. They provided the house with a coat of paint)

The Head Movement Constraint prohibits each of the starred sentences in (9). In (9a, b) the prepositions are head positions which have been skipped over in the derivation. In (9c, d) a noun in specifier position has been incorporated. If Location and Locatum verbs were formed simply by category change, it would be difficult to explain the ungrammaticality of the sentences in (9), but the syntactic analysis of Hale and Keyser explains it straightforwardly.[7]

3. Configurational Theta Theory

Another consistent theme of Hale and Keyser's work is a conception of thematic structure, dubbed the "configurational theory of θ-relations" by Chomsky (1995:313). Beginning in 1992 with an article entitled "The Syntactic Character of Thematic Structure," Hale and Keyser elucidate "a conception of thematic structure according to which 'thematic roles' are identified with points (e. g., NP positions) in syntactic projections, termed Lexical Relational Structures, which are defined by the lexical entries of predicators" (1992:107). This configurational theta theory is one of the overarching themes of Hale and Keyser's work in the four articles under discussion here (cf. Baker 1988, 1996a, b; discussed in more detail in Chapter 5, Section 3 below).

Hale and Keyser begin their outline of this theory by observing that the number of thematic roles discussed in the literature is relatively small[8] and that there are at most four lexical categories (N, V, A, P). One point of their investigations has been to determine what if any relationship can be found to connect these two observable facts of language (1993:65, 1998:74).

As we shall see, their approach to this inquiry has changed over time, but Hale and Keyser have been consistent in their basic position that "in an important sense, *there are no thematic roles*. Instead, there are just the relations determined by the categories and their projections, and these are limited by the small number of categories and by Unambiguous Projection" (1993:68, emphasis added). They further state, "In our view, thematic roles are not part of the basic vocabulary of the theory of argument structure" (1997:36, fn. 6). In essence, then, the configurational theta theory of Hale and Keyser holds that a noun phrase is in a "thematic" relation with a verb (and with other noun phrases) solely by virtue of the position where it is inserted in the argument structure configuration of the verb (1993:68). Contrary to earlier standard views, Hale and Keyser maintain that thematic roles like Agent, Theme, etc., are *not* assigned to nouns according to a subcategorization

frame or theta grid in the lexical entry of a verb. Instead, the lexical entry of a verb contains the structural configuration which defines the thematic roles of its arguments.

Hale and Keyser's configurational view of theta theory implies that there is no hierarchical order for linking theta roles to syntactic positions as has been widely assumed in the literature on argument structure over the past two decades (cf. Perlmutter & Postal 1984; Bresnan & Kanerva 1989; Grimshaw 1990; Jackendoff 1990b; for additional discussion see Chapter 5 below). Although Hale and Keyser do not explicitly rule out the concept of a thematic hierarchy or mapping principles such as the Uniformity of Theta Assignment Hypothesis (Baker 1988, 1996b), they do suggest that such concepts are not theoretically necessary:

> While we feel that the grammatical effects commonly attributed to the thematic hierarchy are genuine, we are not committed to the idea that the hierarchy itself has any status in the theory of grammar—as an autonomous linguistic system, that is. And we are sympathetic with the view (expressed by a number of authors, often tacitly or indirectly) that questions the autonomous existence of thematic roles as well. (1993:65)

In short, Hale and Keyser take an extremely minimal view of thematic relations. As a result, their framework received prominent favorable discussion in Chomsky's *The Minimalist Program* (1995:312-316).

3.1. Categories and Structures

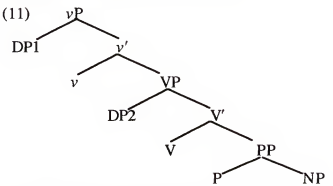
I believe that the great appeal of Hale and Keyser's configurational theta theory lies in the rationale behind it. As outlined in their 1993 article (1993:68-74), the configurational view of thematic relations is based on the concept that lexical categories represent "notional types" generally according to the following paradigm:

(10) *Category:*	*Notional type:*
Noun	entity
Verb	dynamic event
Adjective	state, property
Preposition	interrelation of spatio-temporal coincidence

Together with this view of categories is Hale and Keyser's view that the unambiguous structural relationships between positions of a lexical projection—specifier, head, complement—represent semantic relationships between the notional types occurring in these positions. In other words, they maintain that the structural configurations in which these notional categories occur determine the semantic relations between them.

Consider the VP shell structure below:

(11)



Hale and Keyser first point out that the light verb asymmetrically c-commands the lower verb, and they associate this structural relationship with the semantic relationship of implication such that the matrix event (*v*) "implicates" the subordinate event (V) (1993:69). Such a situation occurs, for example, with the verb *give* ('giving' implies 'receiving,' so to speak). Hale and Keyser describe this implicational relationship between events as causal, which further implies a causer. Thus, the occurrence of DP1 in the specifier position of *v*P represents a situation in which an entity (DP1) causes an event (*v*), as well as the implied event (V). In the configurational theta theory, then, the specifier of a verb with a VP complement has—solely by virtue of this configuration—the semantic role of Agent (or causer) of the event.[9] Chomsky has adopted this configurational view of the Agent role, stating "If a configuration [*v*–VP] is formed with [Spec, *v*], that configuration just *is* an external θ-role . . ." (1995:347, emphasis original). However, Hale and Keyser eventually eliminate the thematic status of [Spec, *v*] from their disucssion since they conclude that, as an external argument, it is not part of the lexical representation of a verb, but a projection of

an inflectional category (1997:58). I will discuss this modification of Hale and Keyser's configurational theta theory further in Section 5.1 below.

Finally, Hale and Keyser note that the occurrence of PP as complement of V in (11) is another implicational relationship (an event (V) implies an interrelation (PP)). Because the preposition represents an interrelation, it requires the involvement of two distinct entities, namely the specifier of VP (DP2) and the complement of the preposition (NP). Hale and Keyser suggest that "the most salient 'meaning' attached to this structure is 'change'" since it represents a situation in which one entity comes to be in an interrelation involving another entity (1993:71). In other words, the event (V) represents some change which brings about the interrelation (P). Since the embedded VP-PP structure in (11) represents a situation of "change," Hale and Keyser refer to the specifier of the embedded VP (DP2) as a "subject of a predicate of change" (1993:72). The object of the preposition (NP) may be referred to as a "reference object" (see discussion in Chapter 5, Section 5).

The fully projected VP shell structure in (11) unambiguously represents these semantic relationships. Thus, for example, in the sentence *Mary put the book on the floor*, there is a causal event of which *Mary* is the subject, and a predicate of change, of which *the book* is the subject. The change which is predicated of *the book* is that it enters into a certain relationship with reference to *the floor*. As suggested by this example, the subject of a predicate of change (e. g., the specifier of a verb which has a PP complement) corresponds to the thematic role of Patient (1993:71-72).[10] Hale and Keyser further point out that the specifier in a VP-AP structure will also have this semantic role (1993:72). Thus, for example, the subject in a sentence such as *The leaves turned red* is a subject of a predicate of change. In short, the specifier in a verb phrase with a PP or AP complement has—solely by virtue of its position in such a configuration—the semantic role of Patient of an event.

3.2. A Gap in the Configurational Theory of Thematic Relations

As summarized in the preceeding paragraphs, Hale and Keyser's configurational theta theory means that the thematic roles Agent and Patient are not assigned to nouns in argument positions according to a thematic grid or a subcategorization frame in the lexical entry of a verb. Instead, the arguments of a verb simply acquire these thematic roles by virtue of the structural positions where they are inserted (or Merged, in the terminology of Minimalism). As mentioned, Hale and Keyser have developed this configurational approach to theta theory in order to account for the "impoverished inventory of thematic roles" (1993:66). So far, however, they have accounted for just two of the "half a dozen or so" thematic roles they claim comprise this inventory (1998:74). Furthermore, it is not clear that Hale and Keyser consider any other thematic roles to be configurationally defined. For example, in a brief discussion on the semantic difference between Location and Locatum verbs, they describe the semantic roles associated with the position of the reference object, that is the base noun which incorporates to form the derived verb:

> In the argument structure of location verbs, the abstract P is of the category "terminal coincidence" (cf. Hale 1986). Its complement corresponds to the "goal" in the conventional terminology of thematic roles; this is generally the end-point in a change of location (though "source", or beginning-point, is not excluded, in theory). The specifier, or inner subject . . . corresponds to the so-called "theme" . . ., representing the entity which undergoes the change. By contrast, the abstract P of locatum verbs is the preposition of "central coincidence". Generally the thematic relations involved here are essentially those of "possession". . . . It includes not only the relation which holds between the horse and a saddle in *saddle the horse*, . . . but also that which holds . . . between the "theme" and the "goal", or "recipient", in a double object construction, as in *give the child a toy*. (1997:36)

As seems clear from this description, Hale and Keyser consider the roles Theme and Goal to be semantically distinct, but they do not consider them to be configurationally defined, since nouns with these roles occur in the same position in the VP shell structure (see (4) and (8a) above, Section 2.2).

I will address this gap in Hale and Keyser's configurational theory of thematic relations in Chapter 5. For the time being, I will just point out that Baker (1996a,b) proposes a similar configurational approach to theta theory which, however, assigns three roles—Agent, Theme, and Goal—to arguments in *v*P specifier, VP specifier, and VP complement positions, respectively (corresponding to DP1, DP2 and NP in (11)). This configuration, however, conflicts with Hale and Keyser's view that Location and Locatum verbs are derived on the same VP shell structure. If, as discussed in the excerpt quoted above, the Locatum verbs are derived from nouns with a Theme role (comparable to the role of *a toy* in *give the child a toy*), then under Baker's version of configurational theta theory, the internal specifier of the VP shell would be the noun that incorporates. This move, however, is barred by the Head Movement Constraint (3), the main theoretical constraint which originally led Hale and Keyser to the view that Location and Locatum verbs are both derived on the same VP shell structure.[11] Thus, one of the main questions to be answered is: Can a configurational view of theta theory be extended to include Theme and Goal roles to account for the distinct semantic roles evident in zero derived Location and Locatum verbs while still operating within the confines of the theoretical constraints on movement? A possible solution to this almost intractable problem will be proposed after a more detailed discussion of thematic roles and the thematic hierarchy in Chapter 5.

4. Full Interpretation Requirements of Predication

One of the key concepts underlying the configurational theta theory is that of predication. This concept, as developed by Hale and Keyser, is based on the principle of Full Interpretation.

(12) *Full Interpretation:*
Every element that appears at LF must have a language-invariant interpretation in terms of interactions with the systems of conceptual structure and language use. (Chomsky 1995:151)

For Hale and Keyser this principle subsumes the following corollaries regarding predication (1993:75-77, 1997:34, 39):

(13) a. a predicate must have a subject,

b. a subject must have a predicate, and

c. a non-predicate cannot have a subject

This approach to Full Interpretation, together with the concept of Unambiguous Projection and the notional types associated with the lexical categories (N, V, A, P) outlined above, suggests the following requirements of argument structure (as summarized by Kiparsky 1997:492; cf. Hale & Keyser 1997:39, 1998:77-82):

(14) a. Minimal V and P take complements; minimal N and A do not

b. Maximal AP and PP are predicates, therefore requiring subjects

c. Maximal NP and VP are non-predicates and cannot have subjects

d. Minimal A is inherently a predicate

e. Minimal P forms a predicate with its complement

Hale and Keyser are quick to point out that there are numerous apparent exceptions to these requirements that remain to be accounted for under this approach; they are simply suggested as a starting point for investigation. As a result of (13a), when V takes an AP or PP complement, it automatically projects a specifier (e. g., DP2, the subject of the predicate of change, in (11)), by a principle of immediacy:

(15) *Immediacy Principle:*
Predication applies as soon as there exists a configuration in which it *can* apply. (Hale & Keyser 1997:59, emphasis original)

One problem with Hale and Keyser's approach to predication is that the requirements of (13) and (14) leave aside the predicate status of the light verb (*v*). As shown in (11), *v*P projects a specifier position, i. e., a subject. Following (13b), then, the complement of *v* should be a predicate. However, the complement of *v* is VP, a non-predicate as indicated above, and so, given requirement (14c), *v*P should *not* have a

subject. Hale and Keyser deal with this conundrum by differentiating between internal and external subjects. In essence, the term "subject" as used in (13) and (14) refers to internal subjects. The subject of *v*P, on the other hand, is an external subject (even though it may be projected inside *v*P as shown in (11)). This admittedly murky distinction will be addressed in more detail below because it is a matter on which Hale and Keyser's position has changed slightly over the years. Nevertheless, their view that predication, as presented in (13), is a matter of Full Interpretation has remained relatively stable.

5. Representational Modifications

Slight modifications to the structural representations used by Hale and Keyser for Location and Locatum verbs have occurred over the years. One change has involved the representation of the external argument position. In the configurational theory of thematic relations outlined above, the position [Spec, *v*] is defined as the position associated with the Agent role. As mentioned, this is because the light verb with a VP complement creates a causative structure, the Larsonian VP shell. It should be noted that Hale and Keyser have used the symbols V, V1, and V* at different times to represent the matrix light verb,[12] but they do not use the symbol *v*. The symbol *v* was adopted by Chomsky to represent the abstract causative light verb in his version of Hale and Keyser's configurational theta theory. In Chomsky's view, "the external argument cannot be lower than [Spec, *v*]. If it is [Spec, *v*], as I will assume, then the *v*–VP configuration can be taken to express the agentive or causative role of the external argument" (1995:315). Hale and Keyser, on the other hand, do not make any representational distinction between the upper and lower verbs in the VP shell configurations underlying Location and Locatum verbs. However, for consistency throughout this discussion, I will use the symbol *v* to represent the matrix light verb as has become standard practice in the literature following Chomsky (1995).

There has also been some variation in the diagramatic symbols Hale and Keyser have used to identify nouns in the conflation structure of Location and Locatum verbs. In

early articles they identified them all as NPs. Later they use the symbol DP to refer to the noun phrases in specifier positions and the symbols NP and N to refer to the bare noun phrase which is incorporated to form the derived verb. For consistency, I will follow this latter usage. It represents the contrast Hale and Keyser point out between nouns that are variables (DP) and nouns that are constants (NP) (1997:35). Since functional phrases cannot intervene between lexical heads which incorporate, any noun which incorporates with a verb must be in a bare NP,[13] and not a DP (cf. Li 1990:423).

5.1. Internal and External Arguments

An important modification to the conflation structures proposed by Hale and Keyser for denominal verbs has to do with the distinction between internal and external subjects in general. In essence they abandon the view summarized above (Section 3.1) that the Agent role is assigned configurationally in a verb phrase. Instead, they propose that the external argument, regardless of its semantic role, is a specifier of a functional phrase (1997:58). This proposal is a consequence of Hale and Keyser's view that VP and NP are not predicates (see (14c)) and explains the following contrasts:

(16) a. The children laughed

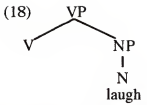
b. *The clown laughed the children
(cf. The clown caused the children to laugh)

(17) a. The cowboys made trouble

b. *The beer made the cowboys trouble
(cf. The beer caused the cowboys to make trouble)[14]

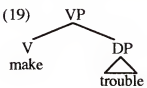
Hale and Keyser point out that in general unergative denominal verbs (16) cannot occur in causative constructions (16b) "because unergative verbs, like *to laugh* do not permit an argument in the Spec position of the verbal projection. And this is so because the complement, being a nominal and therefore not a predicate, does not require and cannot have a subject" (1997:34). Thus, the conflation structure for unergative denominal verbs is as shown in (18):

(18)



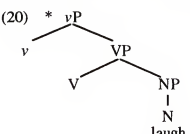
This is identical to the structure of the verb phrase in (17a):

(19)



The transitive verb phrases of (16b) and (17b) would have to be formed by embedding (18) or (19) under a causative light verb phrase (1998:84):

(20) *



Hale and Keyser maintain that this structure cannot, however, represent a hypothetical transitive verb like *laugh* in (16b) because there is no position for the direct object:

> This follows straightforwardly from the fact that the verbal head of the lexical structure of *laugh* [(18)] projects no specifier, nor does its complement (the noun *laugh*) belong to the type of elements whose members force the appearance of a specifier in the projection of the host verb. Hence, there is no place in the lexical structure for the surface object *the children* in the hypothetical transitive clause **the clown laughed the children*. The observations apply generally . . . to the class of verbs known as "unergatives." (1998:84)

In other words, by the principles of Full Interpretation and predication outlined above (Section 4), if the subject of an unergative denominal verb is an external argument, it cannot be interpreted as a subject of a predicate of change (i. e., an internal argument).[15] In contrast, deadjectival verbs can and frequently do occur in transitive constructions:

(21) a. The screen cleared

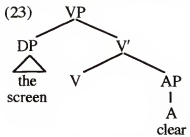
b. We cleared the screen

(22) a. The cowboys got drunk

b. We got the cowboys drunk

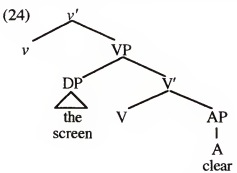
This is because adjectives, as inherent predicates, must have subjects. Accordingly, the structure of the verb phrase in (21a) contains a specifier:

(23)



In the normal course of events, the internal subject (DP) in (23) will raise to an inflectional category for feature checking purposes. Since the V of (23) can and must have a specifier to provide the subject of the AP predicate, this structure can be freely embedded under a causative matrix verb to form a transitive as shown below (1998:85):

(24)



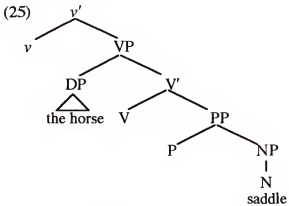
In this case, the subject of the matrix verb is an external subject, just as is the subject of an unergative denominal verb (cf. (18)).

5.2. Location and Locatum Verb Structures Revised

The major change in Hale and Keyser's structural representation of transitive denominal verbs has involved their use of the VP shell structure, the syntactic structure

proposed by Larson (1988) for triadic verbs like *put* and *give*. In 1992 and 1993, Hale and Keyser used the VP shell to represent the conflation structure of zero verbs:

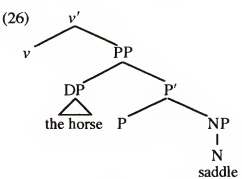
(25)



In this structure, the upper *v* selects a VP whose specifier surfaces as the direct object of the derived verb. Incorporation involves successive raising of the base noun to three abstract heads: P, V, and the light verb *v*.

In 1997, Hale and Keyser modified the VP shell structure by eliminating the embedded VP, so that it is no longer technically a VP shell.

(26)



With the elimination of the embedded VP, the upper *v* selects a fully projected PP. The DP which surfaces as the direct object of the derived verb is generated as the specifier of the PP, not as the subject of an embedded VP. The derived verb is formed by incorporation of the base noun with two abstract heads, P and *v*. Crucially, the status of DP is unchanged; in both structures, (25) and (26), it is the specifier of the complement of *v*, retaining its position as a subject of a predicate of change.

Hale and Keyser's motivation for this change is explicated in their 1997 article. They first note the following contrast (1997:55):

(27) a. The screen cleared

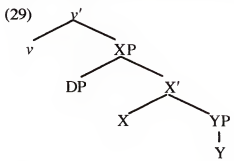
b. We cleared the screen

(28) a. *The books shelved

b. We shelved the books

In general, deadjectival verbs undergo the transitivity alternation in (27), while denominal verbs are basically transitive and generally fail to detransitivize (28). This contrast suggests that the argument structures of the verbs are constrained by the category of their bases. As transitive verbs, both (27b) and (28b) have the generalized structure shown in (29) and involve incorporation into the causative light verb *v*.

(29)



Why is it, then, that the causative light verb is optional with deadjectival verbs, but required with denominal verbs? Hale and Keyser suggest that the difference has to do with the subject-predicate relations in XP. In the deadjectival verbs, YP is a bare adjective phrase. Hale and Keyser define adjectives as *inherent* predicates, and as such they require an "external" subject, the DP specifier of XP in (29). This means, crucially, that AP does not project a specifier. Instead, it must rely on a "host" (e. g., an abstract V; see (23)) to project its subject. In the conflation structure of a deadjectival verb (23), the specifier of V is external to AP, but it is an internal subject of VP, the host which fulfills the predication requirements of the adjective (1998:78, 82). In the denominal verbs, on the other hand, XP is a prepositional phrase (cf. (26)). Unlike adjectives, prepositions are not inherent

predicates, but *form* a predicate with their complement NP. This implies, according to Hale and Keyser's Immediacy Principle, that the subject of the [P, NP] predicate must be an internal subject, that is, specifier of the PP (1997:57). This rationale leads to a formal difference between the structure representing transitive denominal verbs (26) and that of transitive deadjectival verbs (24).

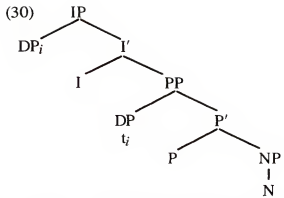
The structural difference between denominal and deadjectival verbs described above still does not explain why (28a) is impossible. If the intransitive deadjectival verb (27a) is formed by raising DP to a functional category, why is this same move impossible for the DP in the prepositional phrase of a denominal verb? Hale and Keyser admit that they do not have a convincing explanation for this (1997:58). They address the impossibility of raising the DP out of the PP in (26) as follows:

> In descriptive terms, the process of head movement enforces a kind of "lexical integrity"—when a verb is formed by incorporation (of N into P, and P into [*v*]), its basic transitivity is thereupon fixed. It is presented to sentential syntax as a transitive if it canonically governs [a DP] there. . . . The "lexical" transitivity . . . can be altered in s-syntax, of course, but only through the agency of special mechanisms such as passivization or middle-formation (or other detransitivizing processes) (1997:59).[16]

This explanation assumes that incorporation into *v* occurs in the lexicon. However, by 1998 Hale and Keyser seem to retreat somewhat from this view. They describe the incorporation of N and P into *v* as "a concomitant of Merge" (1998:86). This implies that incorporation occurs in the syntax, not in the lexicon, since Merge is a generalized transformation of the computational system. With this view, "lexical integrity" loses its explanatory force for the impossibility of intransitive denominal verbs.

There is perhaps a more straightforward reason why verbs formed by incorporation of an adjective can alternate in transitivity but verbs formed by incorporation of a PP are resolutely transitive. In order to have an intransitive verb formed by incorporation of a PP, the specifier of the PP would, in Hale and Keyser's framework, raise to the specifier position of an inflectional category (IP) as in the diagram below.

(30)



There is no reason, in principle, why rasing DP in this manner should be barred. However, the structure in (30) contains no verb, and hence there is no head of an appropriate category to raise to the head of Infl. Or, to put it in other terms, the category P has no features to check by raising to Infl (cf. Hale & Keyser 1998:96). The only way this prepositional head can acquire features to be checked in Infl is if it first raises to an abstract verbal category (e. g., the light verb *v* as in (26)). In short, unless there is a verbal head between Infl and P in the structure (30), the derivation will crash. If there *is* a verbal head above P (as in (26)), then it will be a transitive verb under the rules of Full Interpretation and predication adopted by Hale and Keyser (see Section 5 above).

Consider the structural contrasts between the intransitive (31) and transitive (32) examples below (the subject of the predicate of change is the DP highlighted in bold type):

(31) a. The screen cleared
DP$_j$ [A–V]$_i$–Infl t$_j$ t$_i$

b. *The books shelved
DP$_j$ [N–P]$_i$–Infl t$_j$ t$_i$

(32) a. We cleared the screen
DP1$_j$ Infl t$_j$ [[A–V]$_i$–*v*] **DP2** t$_i$

b. We shelved the books
DP1$_j$ Infl t$_j$ [[N–P]$_i$–*v*] **DP2** t$_i$

In the deadjectival intransitive structure (31a), the subject of the predicate of change (DP) raises and c-commands its predicate after the predicate raises to Infl. In other words, the canonical subject-predicate relationship is unchanged after raising. In the transitive

structures (32), on the other hand, the predicate of change (the inner set of square brackets) raises above its subject (DP2) to *v* in and eventually to Infl. Since the subject of the predicate of change remains in situ, however, the canonical subject-predicate relationship is altered as a result of raising the predicate to *v*. In effect a new predicate is formed, consisting of v^0 (the complex structure in the outeer set of square brackets) and its complement (DP2). This new predicate now requires a subject of its own in order to fulfill the requirements of Full Interpretation. As a result, the light verb must project a specifier position to be occupied by DP1 in (32). This is the structure which gives the light verb its causative meaning as originally described by Hale and Keyser (1993:69; see discussion in Section 3.1 above).

In summary, the representational modifications that have occurred in Hale and Keyser's framework have resulted from their view of subject-predicate relationships under the principle of Full Interpretation. In particular, their suggestion that verbs are not predicates implies that verb phrases do not automatically project a specifier position. This in turn means that the subject of a verb phrase must be an external subject, except in the single case where the complement of the verb is an inherent predicate (i. e., where the complement of V is AP). Adopting this view of Full Interpretation and predication seems to undermine part of Hale and Keyser's original configurational approach to theta theory since the association of the role Agent with the specifier of *v*P is no longer part of their view. As pointed out above, this modification also makes it difficult to explain why Location and Locatum verbs formed by incorporation of an abstract preposition are resolutely transitive, failing to undergo the transitivity alternation that is common with deadjectival verbs. In the previous paragraph, however, I suggested a slightly different approach to handling the transitivity issue, which has the advantage of restoring the specifier of *v*P as a position necessary for Full Interpretation. I will return to the subject of transitivity with a more detailed discussion of thematic roles in Chapter 5.

6. Lexical versus Syntactic Derivations

Throughout Hale and Keyser's work on argument structure there has been a tenuous but nevertheless explicit distinction between "l(exical)-syntax" and "s(ential)-syntax." This view is introduced at the beginning of their 1992 article, and references to both l-syntax and s-syntax persist into their most recent work. In general, this view of a dual syntax holds that there are computational processes occurring in the lexical component and that structures derived by these processes are projected into a distinct component where they are combined in the formation of sentences. This is the viewpoint behind the terminology "*lexical* relational structure" and "*lexical* argument structure" which Hale and Keyser have used in referring to the X-bar structures on which zero verbs are derived. A consistent theme throughout Hale and Keyser's work is that syntactic structures are projected from the lexicon. Indeed they begin their 1998 article with the sentence, "The term 'argument structure' is used here to refer to the syntactic configuration projected by a lexical item" (1998:73). It is interesting to note, however, that by 1998 Hale and Keyser have eliminated the word "lexical" from the name previously used to describe these structures. This change in terminology hints at a subtle change underway in Hale and Keyser's overall approach to the relationship between the lexicon and the syntax.

As indicated by the quote in the previous paragraph, Hale and Keyser's view of argument structure is related to the Projection Principle as formulated by Chomsky:

> (33) *ProjectionPrinciple:*
> Representations at each syntactic level (i. e., LF, and D- and S-structure) are projected from the lexicon, in that they observe the subcategorization properties of lexical items. (1981:29)

The difference between this principle and the view proposed by Hale and Keyser is that Hale and Keyser consider the subcategorization properties of lexical items to be *syntactic* configurations and consequently propose a level of syntax *in* the lexicon, i. e., l-syntax.

Hale and Keyser's view that there is a lexical syntactic level is in direct conflict with a key assumption of the Minimalist program. That is that the lexicon is a list of

idiosyncrasies which serves as the input to the computational system and that there is no Projection Principle or deep structure interface between the lexicon and the computational system. The implication here is that lexical items are not related to each other by computational processes because there are no computational processes in the lexicon. The Minimalist view is that computational processes are driven by the formal features which can be associated with and checked by functional categories. In other words, the Minimalist computational system is strictly a "sentential" syntax. To this extent, Hale and Keyser's approach is consistent with Minimalism, since Hale and Keyser explicitly associate functional categories with their concept of s-syntax (e. g., 1998:75, fn. 2). In spite of the theoretical differences between Hale and Keyser's dual syntax and the Minimalist view of the lexicon, the two research programs are conceptually similar since they both rely fundamentally on principles of economy to explain knowledge of language. This means that it should not be impossible to resolve the conflicts between these two points of view. In the following sections, I will summarize some of the modifications in Hale and Keyser's framework which bring them somewhat closer to the Minimalist point of view and point out additional aspects of their model which still require such modification.

6.1. Dual Syntax

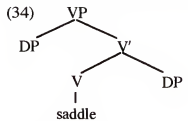
In the beginning Hale and Keyser viewed the conflation structures on which zero verbs are derived as entirely lexical. In 1992 they made a clear distinction between lexical structure and syntactic structure:

> The idea that the grammatical properties of a lexical item are syntactic in character, and that they include dependencies of the type represented by the trace-antecedent relation, should not be taken to imply that the use of a lexical item entails the actual application of movement rules in processing or producing the sentence. (1992:139)

In other words, the lexical relational structure (LRS) of the verbs *saddle* and *shelve*, for example, did not represent a syntactically visible derivational history of the verbs. Instead,

the deep structure representation of these denominal verbs was a transitive VP (34), not the VP shell of the conflation structure described in previous sections (cf. (25)).

(34)



Hale and Keyser's early view was that the simple transitive structure in (34) "which is visible at d-structure is presumably related to the Lexical Relational Structure [(25)] through a mapping principle whose details remain to be determined, which in effect renders d-structure blind to branches which dominate empty categories (i. e., traces, in the framework adopted here)" (1992:139).[17]

Adherence to the Projection Principle (33) requires either that the d-structure of the denominal verbs be transitive as in (34) or, if it is the VP shell structure of (25), that the traces left by incorporation be visible at all levels of syntax. In their 1992 article, Hale and Keyser adopt the former view. By 1993, however, they shift to the latter view. There they state that the VP shell LRS (25) is included in the lexical entry of the denominal verbs and is inserted into the syntax *before* incorporation (1993:95). They point out that their earlier view must be incorrect because the syntax is sensitive to the underlying difference between simple transitive verbs and denominal transitive verbs (1993:97). For example, simple transitive verbs like *make* (35) cannot occur in the middle construction, whereas denominal verbs like *saddle* (36) do so quite freely.

(35) The cowboys made trouble
*Trouble makes easily

(36) Dale saddled her horse
Dale's horse saddles easily

As Hale and Keyser point out, this difference in syntactic behavior relates to the fact that the direct object of *saddle* is a subject of a predicate of change in the verb's underlying structure, which is not the case with the direct object of *make* in (35).

However, the view that incorporation occurs after insertion into the syntax implies that the traces left by incorporation are visible to syntax. This in turn raises another problem addressed by Hale and Keyser in their 1997 article—the occurrence of cognate prepositional phrases.

(37) shelve the books *on the top shelf*
saddle the horse *with a western saddle*

I will take up the issue of cognate PPs in detail in Chapter 6, but briefly the problem is that the verb phrases in (37) cannot be formed by inserting the cognate PPs into the trace positions left by the incorporated N and P without violating the Theta Criterion. Hale and Keyser's tentative solution to this trace problem rests on the notion of an "adverbial increment" of meaning involved in the process of incorporation (1997:42; see discussion in Chapter 6 below). Ironically, this is a notion that they originally relegated to "the cultural encyclopedia" and did not consider to be a matter of grammatical relevance (1992:119,122).

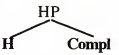
This contrast between Hale and Keyser's early and later views on the meaningful elements of conflation structures points out a more subtle shift in their view of lexical versus syntactic processes and structures. Although they maintain throughout their work that zero verbs are formed by syntactic processes at the lexical level, by 1998 they begin to refer to conflation structures simply as argument structures and not *lexical* argument structures. They also no longer mention deep structure, the theoretical interface between the lexicon and syntax. Instead, for the first time, they describe conflation as a concomitant of Merge (1998:86), a generalized operation of the computational system in the Minimalist framework. They also suggest for the first time that a process of "late insertion" is involved in the formation of zero verbs (1998:92); that is, the phonological content is inserted after spellout in the PF component. Combining the concepts of Merge and late insertion implies a more unified view of the computational system along the lines of the Minimalist program. These modifications in terminology suggest that Hale and Keyser are

leaning away from their view of a dual syntax and are beginning to accept the Minimalist view that there is no internal interface between the lexicon and the computational system.

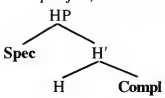
6.2. A Configurational Approach to Category

Another development in Hale and Keyser's 1998 article that lends a more abstract or minimal aspect to their framework is their association of configurational structures with lexical categories. Summarizing their assumptions about Unambiguous Projection, Hale and Keyser point out that phrasal constructions consist of just two structural relations: the head-complement relation and the specifier-head relation. This means that there are four possible structural configurations, regardless of lexical category (1998: 82):

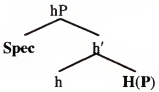
(38) a. *Head and Complement*



b. *Specifier, Head and Complement*



c. *Specifier and Head*



d. *Head only*

Of course, an additional assumption is that all phrases contain a head. Thus, by definition, phrases cannot consist of simply a specifier and/or a complement.

The first three structural configurations above (38a, b, c) are the basic argument structures associated with the three types of verbs Hale and Keyser have focused on

throughout their work. The head-complement relation of (38a) is the structure of denominal unergative verbs like *laugh* and *dance* (as well as of simple transitive verbs like *make* as in *The cowboys made trouble*). The specifier-head-complement relation of (38b) is the structure of a fully projected prepositional phrase which, when embedded as the complement of (38a), forms the argument structure of denominal transitive verbs like *shelve* and *saddle* (cf. (26)).

Configuration (38c) is not quite as straightforward as the previous two, but it represents the argument structure of deadjectival verbs like *clear* and *thicken* (as well as inchoative verbs like *turn* as in *The leaves turned red*). In such configurations, there is a state or property (e. g., *clear, thick, red*) predicated of some subject. Recall Hale and Keyser's earlier predication principle: a predicate must have a subject (1997:39). Because an adjective is inherently a predicate, it does not project a specifier position, but instead acquires its subject externally. Therefore, in order to have a subject, this lexical head needs a host category, typically a verb, which can project a specifier position (1998:78). Thus, the phrasal head (i. e., the host, indicated by the symbol "h" in (38c)) is not the same as the notional or lexical-conceptual head (H) which licenses the argument structure. The structure (38c) can optionally be embedded as the complement of (38a) to form the transitive alternant of the deadjectival verbs (e. g., *We cleared the screen*; *Cold weather turned the leaves red*).

The fact that there are just four possible phrasal configurations (38) coincides with the fact that there are at most four lexical categories. Hale and Keyser point out that this is not a mere coincidence:

> The structural configurations set out in [(38)] are neutral with respect to the morphosyntactic category (i. e., V, N, etc.) of the head. We think that it is right to keep these things separate. While there is, in English, a favored categorial realization of these heads, it does not hold cross-linguistically, and it does not hold universally in any one language, including English. In English, the predominant realizations are as follows: (a) V; (b) P; (c) A; (d) N. However, while (a) and (d) are relatively stable in category, (b) and (c) are less so, being realized often as V. (1998:82)

Hale and Keyser devote the body of their 1998 article to cross-linguistic similarities in the categorial realization of the structures in (38), frequently referring to the "default category" associated with each configuration. They conclude that there are often explicit consistencies within languages between the structural configurations of (38) and "the default, or natural, categorial realizations of the nuclear elements" which project argument structures (1998:115). But they go on to say that

> these things are not always explicit, and we must assume that there is something else which is strongly at work in determining the ability of a language learner to type the verbs of his or her language properly. . . . We assume that the language learner uses the structures of [(38)], together with associated nuclear elements, to name concepts which exist, or can be formed, in an intellectual domain which, like language itself, is part of the human biological heritage and, further, that the relation between a concept and its name is principled and regular. (1998:115-116)

In short, Hale and Keyser seem to be moving towards what might be called a "configurational theory of lexical category" in lieu of their configurational theory of thematic relations.

As Hale and Keyser quite emphatically point out, the phrasal configurations of (38) are not universally realized as the default categories associated with them in the preceding discussion. However, there is a strong suggestion that the phrasal configurations of (38) may universally be associated with the notional types—entity, dynamic event, state, interrelation—described in Hale and Keyser's 1993 article (see Section 3.1 above). If so, this view of phrasal configuration explains quite elegantly their position on the relationship between meaning and structure cited at the beginning of this chapter:

> . . . we maintain that certain crucial aspects of meaning are dependent on the very *structural* features whose identification is at issue. If we "knew the meaning", we would know the structure, perforce, because we know the meaning *from* the structure. (1998:110, emphasis original)

6.3. Toward a Minimalist View

The preceeding discussion suggests a certain ambiguity in Hale and Keyser's framework as to whether conflation occurs in the lexicon or in the syntax. Although the

structures and processes are described as purely syntactic, the overall view is that conflation structures are derived in the lexicon and that they are projected to the level of sentential syntax. Thus, Hale and Keyser advocate a dual syntax, which is seemingly incompatible with the Minimalist view of a unified computational system. However, their framework does not preclude a view that conflation is a post-lexical process. By defining conflation as "a concomitant of Merge" (1998:86), they imply that it occurs after lexical items have entered the computational system, in keeping with Minimalist assumptions. On this view, then, the distinction between l-syntax and s-syntax is not a distinction between two distinct components—the lexicon and the syntax—but rather a distinction between two types of processes in a unified computational system: l-syntax referring to processes involving movement to lexical heads, and s-syntax referring to processes involving movement to functional heads (cf. Miller 1993). This is the overall view that ultimately emerges in Hale and Keyser's most recent discussion of denominal verb formation.

While this view obviates the dual syntax problem, it does not bring Hale and Keyser's model fully in line with Minimalism, however, because they still rely to some extent on an assumption of lexical projection. By 1998, their assumption of lexical projection extends to just four structural configurations (38). This means that a lexical entry must specify which of these structural configurations is associated with the lexical item. In some cases, as Hale and Keyser point out, the structural configuration associated with a lexical item corresponds to a default category (N, V, A, P), so that the lexical entry need only specify the appropriate category. This accounts for the different structures associated with the abstract categories V and P involved in conflation. In other cases, however, the structure associated with a lexical item does not coincide so neatly with its lexical category. Hale and Keyser propose, for example, that verbs like *break* and *grow*, which undergo transitive-inchoative alternation, are associated with the configuration (38c) whose default category realization is adjective (1998:84). This rationale also implies that transitive verbs like *cut* and *feed*, which have no inchoative alternant, must be associated

with the configuration (38b) embedded under a light verb, just like the transitive denominal verbs *shelve* and *saddle*. In short, there is some residue of lexical projection remaining in Hale and Keyser's framework, even as they come closer to a Minimalist point of view.

Another aspect of Hale and Keyser's analysis of zero verbs which suggests that conflation takes place in the lexicon is their description of the abstract category P. As mentioned in Section 3.2 above, they consider P to represent a relationship of central *or* terminal coincidence (cf. Hale 1986). It is this aspect of meaning which distinguishes Location and Locatum verbs, the former involving a relationship of terminal coincidence and the latter a relationship of central coincidence. Hale and Keyser claim that this is also the difference between the dative and double object alternants of verbs like *give*; that is, the dative structure includes an overt preposition of terminal coincidence and the double object alternant includes an abstract preposition of central coincidence (1997:45). In other words, there is no structural difference between a dative verb phrase and its double object alternant, just as there is no structural difference between Location and Locatum verbs.

This structural view raises a thorny question which Hale and Keyser have yet to address: If "we know the meaning *from* the structure" as Hale and Keyser suggest (1998:110), how is it that we know the difference in meaning reflected in the following polysemous Location/Locatum verb pairs?[18]

(39) shelve the books
shelve the library

(40) string the beads
string the guitar

One possible answer within Hale and Keyser's framework is that the lexical entries of the verbs contain not only the conflation structure, but also a specification of which abstract preposition is contained in the conflation structure. This approach is only possible, however, if the conflation structure is part of the lexical entry for a particular lexical item. Another possible answer, more in keeping with the assumptions of Minimalism, is for the

abstract P to acquire an interpretable feature (e. g., [±central]) as it enters the numeration. This might imply that some sort of feature checking process occurs during conflation. Such an approach would be problematic, however, if feature checking involves functional categories inside the conflation structure. A third possible answer to the question of polysemous Location/Locatum verbs might be to consider the matter of interpretation to be post-syntactic, that is a function of the C-I system rather than of the lexicon or as part of a computational feature-checking process. Before resolving this issue it will be necessary to come to some determination about how or whether thematic roles are associated with the abstract preposition in particular (see Chapter 5).

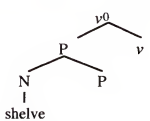
Notes

1. The Empty Category Principle, formulated in the Government and Binding framework of Chomsky (1981), remains valid in Minimalism as a constraint on chain formation, the C-Command Condition: α must c-command its trace (Chomsky 1995:253). Both the ECP and the C-Command Condition imply that movement is always upward and that a moved element governs its trace.

2. Compare the Head Movement Constraint to the Uniform Chain Condition: A chain is uniform with regard to phrase structure status (Chomsky 1995:253).

3. Hale and Keyser modify this structure in later articles. See Section 5 of this Chapter for a discussion of the later modifications.

4. Technically, the head *v* in (6) has an internal structure resulting from incorporation:



5. See Aronoff 1976, 1981 and Lieber 1981, 1992 (discussed in Chapter 4 below) for discussion of category conversion in the derivation of zero verbs.

6. Note that denominal verbs may occur with particles, such as *We penned the animals in/up*. This suggests that the particles may not be treated as heads in the conflation structures of zero verbs.

7. Of course, Hale and Keyser's analysis is straightforward only on the assumptions made. If, for example, the conflation structure of transitive zero verbs is not a VP shell configuration, then the analysis would be completely different.

8. Hale and Keyser suggest that the inventory of thematic roles numbers "half a dozen or so" (1998:74), and they list the following as those most commonly referred to in the literature: Agent, Experiencer, Goal, Source, Location, and Theme (1993:65), citing Bresnan & Kanerva 1989, Grimshaw 1990, Larson 1988, Baker 1988, among others. However, Kiparsky says that it is by no means conclusive that there are few thematic roles (1997:478). Pesetsky (1995) is one commentator who has proposed another configurational theory of argument structure which, however, is based on a finer-grained list of thematic roles; Fujita (1994) is another. Hale and Keyser point out, nevertheless, that "if thematic roles exist, there could in theory be any learnable number of them" and that this is clearly not the case (1993:65).

9. Like Hale and Keyser, I use the thematic label *Agent* to describe the semantic role of the DP specifier of *v*P. However, some distinguish between Agent and Causer thematic roles and the configurational positions they occur in (e. g., Fujita 1994). Others use the label Actor for this argument position (e. g., Jackendoff 1990b:126).

10. Hale and Keyser sometimes use the thematic label *Theme* in discussing the semantic role associated with the subject of a predicate of change. However, for consistency I will use the thematic label *Patient*.

11. Another difference between Hale and Keyser's view of incorporation and that of Baker is Baker's observation that nouns with the role Goal do not incorporate.

12. Hale and Keyser use the V* symbol to represent a verbal projection without a specifier position (1997:51).

13. By bare NP, I mean an NP with a head only (NP=N^0). Conceivably a head noun which incorporates could be a complex N^0_{max}.

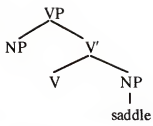
14. Note that the meaning here is not the same as in *The beer caused the cowboys trouble*, which would presumably have a different argument structure representation than the sentence of (17b).

15. There are possible exceptions to Hale and Keyser's observation that unergatives cannot be causatives, e. g., *They ran the car* (example provided by D. Gary Miller, p.c.). Presumably, in Hale and Keyser's approach this transitive verb *ran* would have a distinct lexical entry from the unergative verb in *The car ran*.

16. Another approach to this problem might be to consider the fully projected PP, not just P′, to be a predicate. Then, if PP is a complement of *v*, *v*P must project a specifier, just as VP must project a specifier when the complement of V is AP.

17. The diagram (34) is *not* the diagram that accompanies the text quoted here from page 139 of Hale and Keyser's 1992 article. The diagram printed at that point of their article is:

(i)



I have good reason to believe that this diagram as it appears in the article is misprinted. For one thing, the diagram (i) does not reflect the statements of the text surrounding it (quoted in the paragraph keyed to this footnote). In addition, there is an earlier manuscript of Hale and Keyser's 1992 article in which the surrounding text is precisely identical to that of the 1992 article but in which the diagram (34) appears instead (1991:14). Furthermore, at an earlier point in their 1992 article they show the diagram (34) with the statement "This is surely all there is to the d-structure syntactic projection of VP from the English verb *saddle*" (1992:123).

18. I take it as generally true that speakers are able to assign polysemous Location/Locatum verbs to the appropriate class as long as a direct object is included in the verb phrase (see Kiparsky 1997:477).

CHAPTER 4
PRODUCTIVITY

1. Introduction: Issues in Productivity

A key assumption behind this research project is that zero derivation is a productive process of verb formation in English. Productivity depends on both quantitative and qualitative factors. First and fundamentally, productivity refers to the relative frequency with which a word formation process occurs in a language. In other words, among word formation processes, the ones that occur more frequently are the more productive. Furthermore, especially in the lexicalist tradition since Aronoff (1976), productivity is understood to correlate with "semantic coherence." On this view, the more productive word formation processes are those which are semantically regular and predictable. In a lexicalist approach to word formation, this qualitative aspect of productivity assumes a dynamic view of the mental lexicon and views word formation as a rule governed process. In other words, the lexicon not only lists and stores words whose sound-meaning relationship is idiosyncratic, it also contains rules for creating and interpreting complex novel words based on forms which are listed (Aronoff 1976: 19).

Productivity, if defined solely in terms of frequency, would be a fairly straightforward concept to measure. But once semantic aspects of word formation are brought into the picture, the concept of productivity becomes more abstract and harder to measure. While we may intuitively associate the productivity of a word formation rule with the semantic coherence or predictability of its output, this relationship is subjective rather than objective. One might ask how much has to be predicted about the meaning of a derived word before the word formation process can be considered productive. The

answer to this question has been a matter of perennial debate in modern morphological theory. Moreover, within the Minimalist framework, the basic assumption underlying the relationship between coherence and productivity—that there is a rule governed subcomponent of the lexicon—is subject to debate. In the Minimalist view, the lexicon is outside of the computational system and provides its input. To suggest that there is another computational system of word formation rules inside the lexicon would represent a theoretical redundancy. In short, the concept of productivity is not only complex and debatable, but it also raises crucial theoretical issues.

In this chapter, I outline some of the difficulties and controversies surrounding the notion of productivity as they have emerged in the literature of the past three decades. Focusing on the productivity of zero verbs, I discuss quantitative issues in Section 2, and in Sections 3, 4 and 5, I treat the qualitative issues of semantics, acquisition and pragmatics, respectively. I conclude in Section 6 with a brief theoretical discussion of productivity in the Minimalist framework and a summary of what it means to say that zero derivation is a productive verb formation process in English.

2. Measuring Productivity

One of the first problems in determining productivity is how to measure frequency. To answer this question, one consideration is the distinction between *type* and *token*. For example, in a text containing 20 denominal verbs there may be 10 with the suffix *–ize* and 10 with no suffix (zero verbs); this count refers to tokens, and on this basis the two word formation processes are equally productive in the hypothetical text. However, on closer scrutiny of our hypothetical text we may find that all tokens of the *–ize* suffix occur with the same base (e. g., *moisturize*), whereas zero derivation occurs with four different bases (e. g., *powder*, *shampoo*, *sponge*, *towel*); this count refers to types. With a type-based definition of productivity, zero derivation in this text would be four times as productive as *–ize* suffixation.

Since the definition of productivity involves *relative* frequency, a type-based calculation of frequency is clearly preferable to a token-based calculation. However, Baayen and Lieber (1991) point out that a type-based approach to productivity does not often coincide with native speaker intuitions about productivity. They found, for example, that in a text corpus of over 18 million word forms, the denominal prefix *en–* occurred on 40 bases, compared to the prefix *de–* which occurred on only 32 bases (1991:804). This type-based count suggests that *en–* is 25 percent more productive than *de–*, contrary to the general view that *de–* is frequently used in neologisms while *en–* is moribund. To capture the intuition that novel word formation is part of the definition of productivity, Baayen and Lieber devised a frequency formula based on a ratio of types to tokens.[1] Unfortunately, in Baayen and Lieber's computerized calculations of productivity using their vast corpus, they only considered words derived by overt affixation, and I am not aware of any other attempts to calculate type-token ratios for zero derived words. Therefore, in this discussion I rely on simpler, though potentially less reliable, type-based calculations of productivity.

When discussing productivity based on type, it is important to take into consideration the domain in which a type is defined (Van Marle 1986). For example, one may refer to the productivity of a wide-domain process such as zero derivation in a language. Within this domain, however, there are successively narrower domains, for example as follows:

(1) a. zero derivation of verbs
    b. zero derivation of verbs from nouns
    c. zero derivation of verbs from concrete nouns

Since productivity is relative, a valid statement of productivity will compare types in the same domain. For instance, in comparing the productivity of zero derivation to *–ize* suffixation, zero derivation may be more productive in the domains listed above, while *–ize* may be more productive in a quite different domain, for example verbs formed on a denominal base. Thus, any generalizations about the relative productivity of a word

formation process must be stated in terms of the domains considered. However, it is also true that as the domain of application narrows, the relative productivity of a specific word formation process tends to increase. Conversely, the broader the domain of application, the more competition there is among word formation processes. For example, the suffix *–ize* is considered more productive than zero derivation for forming verbs from latinate nouns and polysyllabic nouns.

In this dissertation research, I focus on a fairly narrow domain: zero derivation of transitive verbs from concrete generic nouns. Although this range is relatively narrow, I would argue that it will enhance rather than limit the generalizations to be drawn by eliminating any ambiguity about the direction of derivation (cf. Clark & Clark 1979:769).

Since relative frequency is the basic factor in determining productivity, many productivity studies are based on computerized search and calculation of types in a text corpus or a dictionary. Although computers are able to handle vast amounts of data, problems do arise. One such problem is illustrated in the productivity study by Baayen and Lieber (1991). While their massive database enables them to make statistically precise calculations about the productivity of each affix included in the search, they completely ignore the process of zero derivation since by definition this process involves no affix. As a result, although their data can tell us that the productivity ratio of verb-forming *–ize*, for example, is 0.0002 compared to 0.0000 for *–ify* (1991:822), it cannot tell us how these compare to the productivity of zero derivation.

An alternative approach, although on a much smaller scale, was undertaken by Pesetsky as part of his research on zero morphology (1995). Pesetsky performed a computer search of all noun-verb pairs with the same spelling from A to C in a dictionary, looking at both headwords and derivatives, in an effort to determine the direction of derivation between the members of the pairs (1995:77-78). Since this search was based on orthography, as Pesetsky points out, the stress-shifting pair *cóntract-contrácт* was retrieved but was later excluded from the data because there is no semantic relationship between the

noun (legal document) and the verb (opposite of expand). What Pesetsky did not mention is that, again due to orthography, certain candidates for inclusion as noun-verb pairs such as *belief-believe* (cf. *shelf-shelve*) were omitted. This oversight weakens the validity of the conclusions Pesetsky draws from his data. Furthermore, productivity studies based on dictionary counts have at least two disadvantages that text-based studies do not have. First, there is no way to determine a type-token ratio, since dictionaries consist of types only. Second, dictionaries exclude innovative forms which provide strong evidence of productivity.

Due to the problems illustrated by the computerized search and calculation procedures just described, no statistically reliable calculations of the productivity of zero derivation are available. Another option is to collect a list of zero verbs attested in actual usage. This approach is similar to a dictionary search in that it counts only types, not tokens. On the other hand, it is text based and so does not exclude innovative forms. Therefore, I am basing the present study on a list of attested zero verbs compiled in large part by Clark and Clark (1979). Including my own additions to the list, this database contains over 1000 transitive verbs derived from concrete nouns (see Appendix). That this is an extensive database is indicated by the fact that it contains five times as many denominal verb types as were found in Baayen and Lieber's 18 million word corpus.[2] In fact, this figure provides indirect evidence for the productivity of zero verb formation relative to the productivity of overt affixation for the formation of denominal verbs.

3. Semantics

3.1. Transparency and Coherence

In addition to frequency of occurence, there are formal and semantic elements of productivity. A key element of productivity is transparency. In structural terms, transparency means that the phonetic form of the base is clearly discernable in the form of a word derived from it. Accordingly, affixes that change the phonetic shape of the base tend

to be less productive than those which have no phonetic effect on the base (cf. Clark 1993:136). Note, for example, the phonetic effect that the suffix *–(i)an* [–ən] has on the stems of the following nominalizations:

(2) logic [ladʒɪk] logician [lodʒɪʃən]
Christ [krajst] Christian [krɪstʃən]
magic [mædʒɪk] magician [mədʒɪʃən]

In these examples, the pronunciations of both the vowel and final consonant of the bases are affected by affixation.[3] In contrast, the nominalizing suffix *–er* has no phonetic effect on the base and is far more productive in forming deverbal agentive nouns (e. g., *baker, publisher, programmer, designer, roofer*, etc.). Structural transparency has semantic implications. If the phonetic form of the base is readily discernable in the form of the derivation, speakers have more evidence for assuming that the derived word shares features of meaning with the base. Thus, Aronoff uses the term "semantic transparency" to indicate the degree to which the meaning of a word can be determined from the meaning of its parts (1976:21).

Words that are opaque, on the other hand, "have no recognizable internal structure or constituents" (Aronoff 1976:20). The result of affixing *–(i)an*, for example, is somewhat, but not completely opaque, as demonstrated in (2). Other word formation processes such as blends (e. g., *modem* '*mod*ulator-*dem*odulator') and acronyms (e. g., *scuba* '*s*elf-*c*ontained *u*nderwater *b*reathing *a*paratus') are extremely opaque, even though the processes occur frequently. In the dual view of the lexicon adopted by Aronoff, words that are semantically opaque must be listed in the permanent lexicon; their form-meaning relationship must be learned on a case-by-case basis. Words that are transparent, however, do not have to be lexically listed unless or until the meaning of the whole is not evident from the meanings of the parts. As Aronoff points out, "words, though they may be formed by regular rules, persist and change once they are in the lexicon" (1976:18). They take on idiosyncrasies of meaning and usage. For example in current usage, a *computer* is

not just 'a machine that computes' (comparable to *dryer* 'a machine that dries'), but it is a specific kind of electronic device for processing and storing information.

New words that a speaker makes up, however, have not had a chance to develop idiosyncratic meanings, and so they will usually be semantically transparent. If newly coined words are not semantically transparent, the speaker will have to provide a definition in order to be understood. This is what will occur with blends and acronyms, for instance. While such processes may be used frequently for coining new words, they are not used productively in the sense being developed here. As a result, productivity, in Aronoff's view, depends on structural and semantic transparency (1976:21). In short, Aronoff recognizes two types of word formation: (a) regular word formation rules (WFRs) which produce transparent forms, and (b) irregular word formation processes which produce semantically opaque new words and are thus not productive (even though they may be utilized frequently).

However, transparency is not a sufficient condition for productivity in Aronoff's view. The semantic condition on productivity is, rather, coherence. "We say that a WFR is coherent when the words formed by that rule adhere closely to the meaning assigned to them by the semantic function of the rule. Put another way, a WFR is coherent to the extent that one can predict the meaning of any word formed by that rule" (Aronoff, 1976:38). To illustrate the difference between transparency and coherence, consider a pair of suffixes, such as *–y* and *–al*, that attach to nouns to form adjectives with the meaning 'having the quality of X,' where *X* represents the base (3a, b).

(3) a. boxy, jazzy, shadowy, watery, papery, catty
    b. magical, sentimental, fictional, institutional, tribal
    c. oriental, spinal, herbal, anecdotal, accidental, suicidal, verbal

While the words in (3) are all transparent in that the base is clearly discernable in the derived form, not all of the adjectives in *–al* are coherent. Those in (3b) have a meaning associated with the rule 'having the quality of X,' while those in (3c) do not have the

meaning associated with the rule. Instead they mean 'pertaining to X' (*oriental, spinal*), 'consisting of X' (*herbal, anecdotal*), 'resulting from X' (*accidental, institutional*), 'resulting in X' (*suicidal*), or something even more idiosyncratic (e. g., "a *verbal* contract").[4] On the other hand, there is a strong correlation between the suffix *–y* and the meaning 'having the quality of X,' making the meaning of the derived adjective quite predictable from the meaning of the base noun.[5] This relationship is weaker with the suffix *–al* since there are many adjectives in *–al* which do not have the prototypical meaning associated with denominal adjectives.

Because the suffix *–al* is not as strongly associated with a prototypical meaning, according to Aronoff, it will not be used as frequently to form new words: "the surer one is of what a word will mean, the more likely one is to use it" (1976:39). The logic of this follows, indirectly, from the idea that the lexicon is not only a list of arbitrary sound-meaning pairs, but also includes a dynamic component in which complex words are built from listed items by the application of meaningful rules. In Aronoff's view, word formation rules are not concatenations of individually listed morphemes—roots and affixes—but rather transformations which alter the phonological, semantic, and syntactic features of a listed item, the base (1976:70-71).

Returning briefly to the example of denominal adjectives in *–y* and *–al*, we find some problems with the notion of coherence and its correlation with productivity. In fact, it is difficult to find a pair of affixes to illustrate coherence which do not differ in some other way affecting productivity. First of all, it is rare to find a pair of affixes associated with one and the same meaning. In addition to the meaning 'having the quality of X,' the *–y* suffix also means 'full of, characterized by X' as in *bosomy, wordy, grassy*, and weather adjectives like *rainy, windy*, etc. (Marchand 1960:287); and like *–al*, it is also found in some words with idiosyncratic meanings, for example *nosey*.

Aronoff compares *–ness* (coherent) and *–ity* to illustrate coherence, but these suffixes are generally associated with different meanings: "*–ness* tends to denote an

embodied attribute or trait, while *–ity* tends to denote an abstract or concrete entity" (Riddle 1985:437). Nor does comparison of *–ness* and *–ity* distinguish coherence from transparency, since *–ity* forms words which may be limited in both coherence and transparency. Furthermore, like the suffixes *–y* and *–al*, *–ness* and *–ity* differ in that the latter is generally restricted to latinate bases. There is a general tendency for the latinate affixes to form words which are both less transparent and less coherent than those formed with native affixes. Aronoff points out that when asked to judge the acceptability of a pair of words formed by competing WFRs (e. g., *connectiveness* and *connectivity*), native speakers tend to associate the less productive WFR (*connectivity*) with a "special" meaning (1976:39). This is not surprising since latinate words tend to be functionally associated with more formal, literary, and technical semantic domains. However, while lack of transparency may occur with lack of coherence, it is not always true that transparency and coherence occur together. Verb forming WFRs are a case in point.

3.2. Transparency and Coherence of Denominal Verbs

The denominal affixes *en–* and *–ize* both form transitive verbs which are structurally transparent. The prefix *en–*, as in *encase*, *imprison*, *enthrone*, derives a transitive verb with a Location meaning 'put Obj. in/on X' (see Walinska de Hackbeil 1986:270). In fact, this is virtually the only meaning associated with *en–* prefixed to nouns,[6] so by Aronoff's definition it represents a highly coherent WFR. Furthermore, *en–* is transparent; while it may undergo assimilation itself, it does not alter the phonological shape of its base. For these reasons, *en–* should be extremely productive, but it is not. A recent unabridged dictionary lists only four entries coined in the 20th century: *enscroll* (1905), *encode* (1930), *encrypt* (1940), and *emplane* (1940). Another indication of the unproductivity of denominal *en–* is that its type-token ratio in the 18 million-word corpus used by Baayen and Lieber was only 0.0019 (1991:822).

The suffix *–ize* also attaches to nouns to form transitive verbs, but there is more than one meaning associated with this suffix (see Marchand 1960:255-259). The most frequently occurring one, according to Marchand, is

(4) a. cause Obj. to be like or become X[7]
capitalize, crystallize, victimize, unionize, colonize, bastardize, itemize, satirize, magnetize

Other meanings associated with *–ize* are:[8]

(4) b. subject Obj. to the effect of X
hospitalize, jeopardize, scrutinize, terrorize, emphasize, categorize, computerize

c. affect Obj. in the manner of X
burglarize, patronize, monopolize, Stalinize, galvanize, computerize

d. impregnate, treat or combine Obj. with X (in technical fields)
carbonize, hydrogenize, ionize, energize

The verbs *weatherize* and *winterize* seem to make up a separate category of their own.

On the whole I find the meanings associated with *–ize* to be somewhat nebulous. For example, Marchand categorizes *motorize* with *itemize* ('give Obj. the character or shape of X') (1960:258), while I consider them to have quite different meanings. At any rate, these semantic categories are not as neatly defined as the semantic category associated with *en–*. Because of the numerous and fuzzy semantic categories associated with *–ize*, it is more difficult to predict the meaning of the derived verb from the meaning of the base. Therefore, in Aronoff's terms, *–ize* is less coherent than *en–*. Moreover, *–ize* may produce certain phonological alterations to its base such as deletion of final vowel (*colonize, energize, propagandize*), and occasionally vowel laxing (*satire/satirize*). Thus, word formations with *–ize* are slightly less transparent than those with *en–*. Nevertheless, *–ize* is considered a fairly productive verb forming affix in English. Its type-token ratio in the Baayen and Lieber corpus is 0.0068, more than three times the figure for *en–* (1991:822). Recent coinages in *–ize* include *computerize* (1955) and *prioritize* (1960). I have seen it

affixed to a proper name in a creative innovation as recently as May 1998 (*Morthamize* 'to cause Obj. to be like Sandy Mortham (Florida government official),' cf. *victimize*).

If one considers zero derivation the result of affixation of a phonologically null morpheme {Ø}, then denominal Ø may be compared to the overt affixes *en–* and *–ize* in forming transitive verbs. Like *–ize*, Ø is associated with several different meanings:

(5) a. put Obj. in/on X (compare to *encase*)
bottle, shelve, jail, pocket, map, land, shoulder, package, seat, etc.

b. cause Obj. to be like or become X (compare to *crystallize*)
orphan, baby, martyr, cluster, pile, coil, dice, cup, cash, treasure, etc.

c. affect Obj. in the manner of X (compare to *burglarize*)
umpire, mother, guard, butcher, tailor, boss, parrot, dog, wolf, etc.

d. put X in/on Obj.
saddle, paper, roof, carpet, dress, salt, hem, cork, water, fence, etc.

e. utilize X to affect Obj.
anchor, hammer, truck, telephone, knife, bomb, spoon, elbow, etc.

f. remove X from Obj.
shell, bone, scale, skin, scalp, milk, dust, core, weed, worm, hay, etc.

The verbs in categories (5a), (5b) and (5c) have the same semantic relationship to their base nouns as verbs in *en–* and *–ize*. All of the verbs in (5) are formed from concrete nouns which makes it easy to paraphrase the meanings. On the other hand, when transitive verbs are zero derived from abstract nouns, they fall into fuzzier semantic categories, like many verbs formed with *–ize*:

(6) subject Obj. to the effect of X (compare to *terrorize, emphasize*)
question, proposition, impact, ransom, comfort, contact, pressure

There are also some transitive zero verbs which form more idiosyncratic semantic categories, for example the following related to sports or other jargon:

(7) affect the X (part) of Obj.
rim, wing, blindside, kneecap, rear-end

In short, many of the semantic categories associated with zero derived verbs are similar to those associated with verbs in *–ize*. Like verbs in *–ize*, they fall into several

different semantic categories, including categories which are idiosyncratically related to certain semantic fields or registers. Thus, by Aronoff's standards, zero verbs are not semantically coherent. However, they are widely considered to be highly productive. Marchand identifies them as the most productive type of denominal verbs in present day English (PE):

> The only derivative morphemes PE has for denominal verbs are *–ate, –ize, –ify*. They have restricted range of derivative force: *–ate* is latinizing and learned, *–ify* is learned while *–ize* is chiefly technical. All three derive almost exclusively on a Latin morphologic basis. . . . Derivation by a zero morpheme . . . must therefore be considered the norm and is quite naturally very strong in English. . . . English *be–* has never played a serious role in denominal derivation. Nor has the type *em–bed* ever been productive to any larger extent. (1960:296)

Even Aronoff refers to zero derived denominal verbs as productive in spite of the fact that they seem to lack semantic coherence (1976:71). Unfortunately, as mentioned, there are no statistical calculations of the productivity of zero verbs as there are for verbs in *en–* and *–ize*. Nevertheless, it seems clear that zero derivation, like *–ize* affixation, is a word formation process that reflects little correlation between semantic coherence and productivity.

As a matter of fact, when the three verb forming processes—affixation of *en–*, *–ize* and Ø—are compared, it seems that there is an *inverse* relationship between productivity and semantic coherence. The prefix *en–* is associated with one meaning that is easy to paraphrase, so it is highly predictable and semantically coherent. However, *en–* is virtually unproductive since it is no longer used to form new denominal verbs in English. On the other hand, *–ize* affixation and zero derivation are each associated with several different meanings, making the semantics of these denominal verbs hard to predict. Yet *–ize* is a fairly productive suffix whose usage has not diminished since it was introduced, and zero derivation has been productive throughout the history of English (cf. Lee 1948, Quirk & Wrenn 1994:105). In conclusion, the degree of productivity does not correlate with the

coherence of meaning, and where the formation of denominal verbs is concerned, the purported correlation between coherence and productivity is counterfactual.

Furthermore, it is not at all clear that this inverse relationship between coherence and productivity is limited to verb forming processes. If semantic coherence (i. e., predictability) were the standard for productivity, then compounding would be another unproductive word formation process in English. While they are widely considered productive, noun-noun compounds for instance are notoriously unpredictable in meaning. As a brief illustration, consider the following series:

(8) a. sea horse, sea oats, sea cruise, sea salt, sea wall, seascape

b. newspaper, toilet paper, crepe paper, wall paper, wax paper

In the first series (8a), *sea* rougly represents a location in relation to the head of each compound, but the semantics of this relationship might be *in* the sea, *near* the sea, *on* the sea, *from* the sea, etc. And when the head of the compound remains constant as in (8b), the semantic relationship between modifier and head can vary even more drastically. This is not to suggest, however, that noun-noun compounds are not readily interpretable, since they are highly transparent. (See Ryder (1994) for a discussion of the semantics and productivity of noun-noun compounds.) In short, to concur with the view that productivity depends on semantic coherence, one would have to concede that zero derivation and compounding are unproductive word formation processes in English.

3.3. Subcategorization Restrictions of Affixes

One linguist who disputes the productivity of zero derivation in English is Lieber (1981, 1992). In a 1981 article, she sets out her position that zero verbs are not derived by a word formation process but instead result from lexical relisting (conversion). This position is based on her theoretical assumptions about how the lexicon is organized. Lieber conceives of the lexicon as consisting of two subcomponents, a permanent lexicon and a lexical structure subcomponent (1981:162-166). The permanent lexicon contains a listing

of all idiosyncratic sound-meaning pairs of the language including roots and affixes. The lexical structure subcomponent is where complex words are formed according to context-free rewrite rules which generate hierarchical structures into which items from the permanent lexicon are inserted. While both Lieber and Aronoff view the lexicon as having permanent and dynamic subcomponents, Lieber's view differs from that taken by Aronoff who considers affixes to be rules of the dynamic component and not listed items of the permanent lexicon. In Lieber's view of the lexicon, the lexical entries of affixes, like other lexical entries, include subcategorization restrictions which determine the lexicosyntactic features of the complex word structures into which they are inserted. For example, the deverbal suffix *–er* is subcategorized to attach to verbs and to create an agentive or instrumental noun.[9]

Given this view of the lexicon, Lieber determines that there are only two possible arguments for the existence of a phonologically null affix: either it has an overt counterpart in the language (i. e., it is an allomorph of a phonologically overt affix); or it represents a unique, and therefore learnable, subcategorization frame which is reflected in a single uniform predicate argument structure (PAS) in the syntax (1981:179). Lieber concludes that neither of these arguments can be supported, and that therefore zero verbs are not derived from nouns but are separately listed lexical items (1981:181).

Lieber (1992) attempts to demonstrate that zero verbs in English are not formed by affixation of a phonologically null allomorph of *–ize*. According to Lieber, *–ize* is subcategorized to select a noun or an adjective as its base and forms verbs with a transitive argument structure. Specifically, *–ize* assigns its theta roles outside of the verb it forms, and it selects a base that is, in Lieber's terms, a predicate (e. g., *unionize* 'Agent makes Patient a union') (1992:57). In other words, the base noun *union* is not assigned a theta role. With this subcategorization frame, Lieber claims, "all new verbs formed with *–ize* are obligatorily transitive. . . . The few nontransitive verbs in *–ize* will be listed in the [permanent] lexicon. *Productive* derivations, however, will be uniform in PAS, because

the affix imposes a uniform PAS on its outupt" (1992:162, emphasis added). Lieber goes on to argue that because zero verbs may be transitive or intransitive, "the output of conversion does not display uniformity of PAS, as we would expect if this process were the result of affixation of a zero morpheme" (1992:162; see also 1981:178).

In contrast to the suffix *–ize*, Lieber suggests that the prefix *en–* assigns an obligatory theta role (Location) to its base, and as a prefix it is structurally positioned to do so, since theta roles are assigned to the right in English (1992:57). On the other hand, because *–ize* is a suffix, it is not in a position to assign any theta roles to its base. One fact missing from this analysis is that denominal verbs formed with *en–* are all transitive, which means that these verbs assign the same Agent and Patient theta roles as transitive verbs in *–ize*. Since the base noun selected by *en–* cannot assign theta roles, we must assume that these word external theta roles are assigned by the prefix itself, just as they are assigned by the transitivizing suffix *–ize*.[10] Consequently, it is clear that both prefixes and suffixes are obliged to go outside the word to assign theta roles if they form transitive denominal verbs.

Lieber notes that there are certain exceptions to her analysis of the suffix *–ize*. She suggests that verbs like *motorize* and *hospitalize*, though transitive, are not formed with "productive" *–ize* because the stems do seem to have internally assigned theta roles (1992: 208, fn. 28). Another example, not mentioned by Lieber, is *computerize* in which the suffix seems capable of assigning two different theta roles internally (Theme: 'equip Obj. with computers' or Goal: 'store Obj. in a computer'). Therefore, Lieber treats these exceptions like the intransitive verbs in *–ize*; they are given separate idiosyncratic listings in the permanent lexicon.[11]

Another problem with Lieber's analysis of *–ize* in contrast to zero derivation is that there are more than just a few intransitive verbs in *–ize*, and I doubt that "all new verbs formed with *–ize* are obligatorily transitive," as Lieber claims (1992:162). In fact, I suspect that it is because of the predicative semantics associated with *–ize* ('(cause Obj.) to be or become like X') that many verbs in *–ize* are susceptible to the transitive-inchoative

alternation (e. g., *the syrup crystallized overnight*).[12] However, even if we concede that "productive" *–ize* forms transitive verbs—relegating the inchoative alternation to a lexical redundancy rule and listing all other intransitive verbs in *–ize* individually—what would prevent making the same exception for intransitive zero verbs? Hypothetically we could then say that "productive" zero derivation forms transitive verbs, which, like verbs formed with *–ize*, take a kind of predicate as their base and assign obligitory theta roles outside of the derived word. This is precisely the analysis of zero verbs proposed by Hale and Keyser, who consider zero verbs to be formed from a "predicate of change" (1993:71).[13] In Hale and Keyser's view, "there is no process of 'thematic role assignment,' apart from predication; and there are no 'thematic roles,' apart from the lexical relations expressed in unambiguous, fully interpreted projections for the elementary lexical categories" (1993:93-94). Another key difference between Hale and Keyser's approach and Lieber's is that lexical relisting is not an option in their theoretical framework, while it is the only analysis Lieber finds that reflects her intuitive view that zero derivation is random and not productive. In short, the theoretical core of Lieber's view of derivation (predicate agument structure and subcategorization frames) is not necessarily inconsistent with a view of zero verbs as productive. In fact, it seems that by presuming zero derivation to be unproductive, Lieber is forced to add a loophole to her theory—the concept of relisting—just to account for zero verbs.

3.4. Productivity versus Creativity

In her 1992 book *Deconstructing Morphology*, Lieber's stated goal is to show that "the rules of word formation *are* in fact the rules of syntax" and that there is no need in the grammar for a separate morphology component (1992:vii, emphasis original). She begins her discussion of conversion (zero verb formation) by summarizing three approaches to the process: (a) category changing, which is a purely morphological rule performed by relabeling or by bracketing; (b) zero affixation, which traditionally posits that zero

morphemes, or null affixes, exist as lexical entries and which predicts that zero affixes act like overt affixes, producing the same effects; and (c) relisting, which "occurs when an item already listed in the lexicon is reentered as an item of a different category" and which makes no prediction about the semantic or thematic relationship between the listed forms (1992:159).

Lieber flatly rejects the category changing approach, stating that it is "ruled out within the present theory for a simple reason. Category-changing rules of this sort cannot be reduced to independently needed rules or principles of the Government-Binding framework" (1992:158). The other two approaches do not require separate morphological rules, however. Lieber accepts the zero affixation analysis for synthetic compounds involving category shift, especially in French (1992:160), but rejects it for zero verbs because of the stipulation that zero affixes operate like overt affixes. As mentioned above, she considers the overt affix *–ize* to be productively transitive, but considers zero derivation ambiguous as to transitivity or intransitivity. Exceptions to the *-ize* rule, such as the intransitive verbs *agonize* and *theorize*, are simply given separate listings in the lexicon under Lieber's theory, which means that she does not account for the semantic relationships between *agony* and *agonize* or *theory* and *theorize*. Similarly, she maintains that "conversion/relisting is a random process" (1992:164).

In the end, to account for zero verbs, Lieber concludes that relisting is "the alternative we are left with in the present theory" since it is the only analysis which does not require a separate morphological rule and also does not require that there be any semantic relationship between the nouns and verbs which are homophonous (1992:162). It is this conclusion which is bound up with Lieber's understanding of productivity, because the relisting analysis entails that the process of conversion is not productive. According to Lieber, "if conversion is a sort of relisting in the lexicon, then it is a kind of creative coinage . . . rather than a truly productive form of word formation" (1992:163). A creative coinage—in contrast to a productive one—results in a word which is "perceived by native

speakers as odd, amusing, repulsive or otherwise remarkable" (1992:3). Therefore, in Lieber's view, if conversion is not productive it will result in new forms that stand out:

> My impression again is that this is true for English. New verbs formed by conversion from nouns often do strike us as odd or outlandish. The verb "to gift" . . . evokes a typical "creative coinage response" for me, as does the verb "to impact". . . . Words coined by conversion should cease to attract attention only when they are firmly entrenched in the lexicon. (1992:163)

This impressionistic, intuitive definition of productivity has very little theoretical utility. It is not the same thing as a native speaker's grammaticality judgment. If it were, zero verbs as a class would be considered unacceptable by native speakers in general, at the same level of unacceptability as **comput–ize–ation–er*.

My impression, in contrast to Lieber's, is that newly coined words, whether formed by productive or unproductive processes, often stand out, perhaps simply because they are new. According to Lieber, "no English speaker would ever take note of the creation of a new noun in *–ity* from a base in *–able*" because of the paradigmatic productivity of this word formation process (1992:3). However, as an attested counterexample, I myself found the word *knowledgeability* rather odd on first encountering it (e. g., "knowledgeability of baseball" (i. e., ability to cite baseball statistics)). The oddness of this word, like the oddness of Lieber's example *to gift*, probably results from blocking, that is the existence of the more common words of the same categories, *knowledge* and *give*, from which the bases *knowledgable* and *gift* were derived.[14] On the other hand, the most creative coinages are ones that involve no derivation at all (e. g., *quark, modem*). Nevertheless, as long as such words obey the phonotactic rules of the language, they are not likely to be perceived by native speakers as odd, amusing or repulsive; they are noticeable only to the extent that they have to be learned.

Lieber's position is that words which are formed by relisting are words that have to be learned because, by definition, the meaning is unpredictable from the form. However, the two examples she gives, *to gift* and *to impact*, appear to be counterexamples. I doubt

whether a native speaker who knows the meaning of the nouns *gift* and *impact* would have any difficulty predicting the meaning of these verbs. Even when a zero verb has a totally idiosyncratic meaning, unpredictable from the generic meaning of the base noun (e. g., *to card someone* 'to ask someone for identification, proof of age'), it does not seem to raise the same intuitive objections Lieber raised with *to gift* and *to impact*. Consequently, Lieber's distinction between productivity and creativity does not, in my view, apply to the derivation of zero verbs as a type. Word formation processes identified by Lieber as productive may result in derived forms whose meanings are not completely predictable from the meaning of the base (e. g., *knowledgeability*). Conversely, those identified as creative (e. g., *to gift, to impact*) may result in derived forms whose meanings are quite predictable from the meaning of the base.

3.5. Summary

While Lieber and Aronoff differ somewhat in their views of the lexicon, they both count frequency of occurrence and predictability of meaning as necessary ingredients of productivity. However, neither Lieber nor Aronoff is clear about the degree of predictability required to consider a frequently occurring word formation process productive. Both recognize, in fact, that even among the most frequent types of derivation, there will be derived words whose meanings are not predictable from the meaning of their base. For Lieber, these are random occurrences; for Aronoff they result from the tendency of lexical items to "persist and change." For both, these instances of unpredictable semantics are accounted for by listing, or relisting, in the permanent lexicon. Productivity, on the other hand, is accounted for in the processes of the dynamic subcomponent of the lexicon. Speakers of a language are able to spontaneously produce and interpret newly derived forms because of the rule-governed nature of the dynamic lexicon. For both Lieber and Aronoff, these lexical rules (the WFRs of Aronoff and the subcategorization frames for affixes of Lieber) are the key to semantic predictability. I have suggested, however, that a

word formation process can be productive without being completely semantically predictable. The question that remains is, assuming that zero verbs are productive, to what degree are they semantically predictable? This question will be addressed in detail in Chapter 5.

4. Productivity and Acquisition

One study that provides support for the productivity of zero derivation was conducted by Clark (1993). In a systematic text-based study of the innovative words produced by young children, Clark found that zero derivation is the only process young children use to form denominal verbs in English and other Indo-European languages. The basic assumption of Principles and Parameters is that children acquire their native language by setting parameters in a universal grammar according to the input they hear. Under this assumption, we would expect children to rely most consistently on the word formation processes that are the most frequently and readily observable ones in the adult language of their environment. If so, the fact that children rely solely on zero derivation to form denominal verbs supports the view that zero verbs are productive in English.

The question posed by Clark is: Why is it that zero derivation is the only process children use to form denominal verbs? Several contributing factors emerge from the research on language acquisition reviewed by Clark. First of all, children have a practical need to invent new verbs. Children begin to devise new words well before they have acquired all the syntactic parameters of their language. By age two, over half of a child's vocabulary consists of nouns, but only about 15 percent is verbs (1993:30-31). Also at this age, children are progressing in their syntactic development from one- and two-word utterances to telegraphic sentences (1993:203). The point at which English speaking children begin to create innovative verbs coincides with their discovery of transitivity; the first SVO sentences appear at about this time. At this point they also begin to use transitive-intransitive shifts (e. g., "mommy itched me") and periphrastics with *get* and

make (e. g., "daddy made my hair dry") (1993:201). Consequently, at about two years of age, children are beginning to construct sentences around verbs, but their lexicon contains very few verbs available for this purpose. Since their vocabulary is very rich in nouns, the primary lexical resource available to children for forming new words is nouns. Cross-linguistically, the research cited by Clark shows that children create new verbs mainly from nouns (1993:198) and that these innovative verbs are usually transitive (1993:205). In short, the acquisition research demonstrates that young children have both the practical need and the lexical and syntactic resources to devise novel verbs from nouns.

Zero derivation and compounding are the most frequently used processes of word formation for English speaking children, from about age two. By and large, English speaking children between the ages of two and five form noun-noun compounds to create novel nouns, and they form zero verbs to create novel verbs (Clark 1993:116-117).[15] While they begin to use derivational affixes around the same time, they acquire them more slowly. Clark points out that, in order to form new words by affixation, children first must be able to isolate affixes from the language used around them. This task requires that the affixes be used frequently in the adult language and that the derived forms be structurally transparent (1993:115). Another factor is the position of the affix. According to Clark, extensive cross-linguistic research has shown that children isolate and master suffixes before prefixes (1993:121). The combination of these factors seems to preclude English speaking children from devising new denominal verbs by affixation. Of the five most frequently occurring denominal affixes in English, two are prefixes (*en–* and *de–*). The remaining three are suffixes associated with latinate forms (*–ize, –ify,* and *–ate*), which are less likely than native forms to occur frequently in the linguistic input available to children. As a result, English speaking children do not use any of these denominal affixes until the age of five or later; all of their innovative denominal verbs are formed by zero derivation (Clark 1993:202-203).

Zero derivation is also used by children acquiring languages in which it has not been considered a productive word formation process. Clark surveyed the research on lexical acquisition of children aged two to five in a number of language environments. Zero derivation of denominal verbs is found with some frequency in child utterances in Slavic languages (Polish, Russian, and Serbo-Croatian) (1993:210), and it is used even more widely by Dutch, German, and Swedish children from a young age (1993:208). In Dutch, the research cited by Clark indicates that denominal prefixes such as *be-* [16] gain preference as children get older (1993:206). However, there is a contrasting trend among French children, where zero derivation is somewhat rare before age four. Rather, studies indicate that French children prefer to use an overt light verb phrase from the early stages of acquisition until about age six (1993:209-210):

(9)	*Child version:*		*Adult version:*	
	faire de la marche	'to do walking'	marcher	'to walk'
	faire les jardins	'to do the gardens'	jardiner	'to garden'

Research indicates that the same preference for causative periphrastics exists among Italian, Portuguese, and Spanish speaking children (1993:210). Clark concludes, "in languages that allow zero-derivation, children construct new verbs from nouns as early as age two. And where zero-derivation is an option, children do not make use of any suffixal options at all" (1993:217).

Clark points out, however, that children do not always use a word form that matches adult preferences (see Table 1 at the end of this section). There are two main reasons for this. First, children do not start out knowing the established items of the adult lexicon (1993:137). This means that children have a greater need than adults to invent new words, and inevitably they will invent many that do not match those in the adult lexicon. Second, Clark points out that children do not start out knowing the regular morphological rules of their language. She views the parameter setting process as a matter of children testing and refining hypotheses about how form and meaning are mapped in their language.

Therefore, the more transparent and frequent a word formation process is, the easier it is for children to observe and the more rapidly it will be adopted as a strategy for filling the gaps in their lexicon (1993:137-138). In this view, it is not surprising that children invent zero verbs if they observe them in the language of their environment, because zero derivation is the simplest and most transparent word formation process. In short, Clark's answer to the question of why children use zero verbs is that they have a practical need to fill gaps in their lexicon and zero derivation is the most straightforward means to do it.

In addition, I would like to suggest another reason why children use zero verbs during the period of language acquisition. It appears from some of the data reported by Clark that children use zero verbs as a vocabulary building strategy. The examples in (10), (11), and (12) below are all from Clark (1993:200-202), but the observations are mine. One of the strategies children might use to reinforce their vocabulary is the technique of narrating their play:

(10) a. (looking through a transparent piece of pink plastic): *I pinking things*

b. (putting different objects into playdough she was kneading): *I think I'll bead it. I think I'll rubberband it.*

c. (making dots over a drawing): *It's snowflaking so hard you can't even see this person.*

By using zero verbs in this way, children appear to be associating the names for things with actions as they perform them.

Another strategy for vocabulary building (used by both children and adults) is repetition, specifically repeating a new word in a different context:

(11) a. (after mention of boats): *And we might see a man oaring a boat with oars.*

b. (playing with a small figure holding a scythe just after mother told him what a scythe was called): *I'm going to make him scythe.*

c. (watching the revolving back of a cement truck): *That truck is cementing.*

In these examples, the children seem to have taken a newly acquired noun and used it as a verb to denote an action involving the noun. By repeating new words in different contexts, speakers test hypotheses about how form and meaning are mapped in lexical items. I would suggest that when children repeat new nouns as verbs, they may be testing hypotheses about the meanings of the nouns and not necessarily about a process for deriving verbs from nouns.

Finally, children often combine both strategies, narrating their play with frequent repetitions:

(12) a. (tapping on the car-window with a tiny plastic axe): *I'm axing this, look: ax, ax, ax.*

b. (playing with two interlocked plastic rings at the pool): *I know what—I'll frisbee this. I'll frisbee this into the water.*

c. (fantasizing): *A fire! A fire! A fire is coming. Our house is firing.*

The preceeding examples (10), (11), and (12) suggest that it is not only to fill a gap in their lexicon that children devise zero verbs. Perhaps as importantly, they do it as a strategy for memorizing and testing hypotheses about the meanings of both nouns and verbs.

Table 1: Examples of Innovative Zero Verbs from Children

Age 2	bow: vi	'make noise with a bow' (of a violin)
	broom: vt	'hit obj. with broom'
	button: vt	'press buttons to operate obj.'
	car: vt	'give obj./speaker a (toy) car'
	cello: vi	'play the cello'
	fire: vt	'light obj. using flame'
	flagging: vi	'wave as a flag waves'
	hair: vt	'brush hair of obj./speaker'
	horn: vt	'touch obj. with a horn'
	lawning: vi	'mowing the lawn'
	needle: vt	'mend obj. with needle'
	nipple: vt	'nurse a baby'
	noise: vi	'make noise'
	oaring: vt	'use oars to paddle obj.' ("see a man oaring a boat with oars")
	pump: vt	'use pump to put gasoline in obj.'
	rug: vi	'to vacuum the rug'

Table 1—Continued

	sander: vi	'use floor-sander'
	sanding: vi	'producing "sand"' (actually grinding pepper)
	scale: vt	'weigh using a scale'
	shape: vt	'make shapes from molds' ("I'm gonna shape em all out" [turn out the molds])
	souping: vi	'eating soup'
	stomach: vt	'hit obj. in stomach'
	stove: vt	'burn obj./speaker on stove'
	trouser: vt	'put trousers on obj./speaker'
	water: vi	'play in the bath water'
	water: vt	'rinse obj. with water'
	wind: vi	[weather verb] 'blow' ("it will wind" [wind will blow])
Age 3	axing, ax: vt:	'hit obj. with ax' ("I'm axing this, look: ax, ax, ax")
	bell: vi	'ring'
	blade: vt	'cut obj./speaker with a Cuisinart blade'
	cementing: vi	'making cement' (of a cement truck in operation)
	coastguard: vt	'make [a toy boat] act as a coastguard boat'
	dropping: vi	'coming down in drops' (of rain)
	dust: vt	'to get dust on obj.'
	fire: vt	'burn, set fire to obj.'
	firing: vi	'burning, catching on fire'
	flagging: vi	'waving as a flag waves' ("That flag is flagging")
	fog: vi	[weather verb] ("Maybe it rained or fogged yesterday")
	fork: vt	'to pick up obj. with fork'
	frisbee: vt	'play with obj. as one plays with frisbee'
	gun: vt	'shoot obj. with a gun'
	key: vt	'put a key into obj.'
	lawnmower: vt	'to run over obj. with lawnmower'
	magic: vi	'disappear'
	match: vt	'light obj. using match'
	marble: vt	'roll obj. in lap like marbles'
	pianoing: vi	'playing the piano'
	to pliers: vt	'use pliers [actually tongs] on obj'
	prayer: vi	'pray' (of a prayer book "He prayers with it")
	snowflaking: vi	'developing snowflakes' (while drawing dots on a picture)
	stick: vt	'use stick' ("let me stick it hard" taking stick and touching it firmly on the ground)
	teaing: vi	'steeping' (of teabag)
	torch: vi	'use torch-light' ("I want to torch with the torch-light")
	warring: vi	'fighting a war'
	wave: vi	'surge' ("will it wave in?" [will sea water fill a hole in the sand?])
	wheel: vt	'make wheels of obj. turn'
	wind: vt	'blow' ("it will wind all the toys away")
	Woodstock: vt	'hit obj. with toy Woodstock character'

Table 1—Continued

	wrench: vt	'use a wrench to construct obj.'
	yoyo: vt	'make obj./yoyo work' ("wind this [yoyo] up for me so I can yoyo it down")
Age 4-6	ax: vt	'chop obj. with ax'
	ballerining: vi	'dancing'
	barrette: vt	'fasten obj. in barrette'
	bead: vt	'put beads in obj.' (obj. is playdough)
	blade: vt	'cut obj. with toy propeller blade'
	deck: vt	'cut deck of cards'
	decorationed: vt	'put decorations on obj.' (of Christmas tree)
	lemonade: vt	'pour lemonade on obj.'
	milk: vi	'get milk by nursing'
	milk: vt	'give milk to obj. by nursing'
	nut: vt	'crack obj. open' (of walnuts)
	paper: vt	'give obj./speaker paper cuts'
	rubber-band:	'put rubber bands in obj.' (obj. is playdough)
	scissor: vt	'cut obj. with scissors'
	scythe: vi	'use scythe' ("I'm going to make him scythe" of a figurine with a scythe)
	shirting: vt	'putting shirt on obj.'
	sticking: vt	'hit obj. with stick'
	string: vi/vt	'use string' ("we can string down to the hold [of a toy ship] and then I'll string things out of the hold")
	stroller: vt	'push obj. [baby] in stroller'
	sword: vt	'hit obj. with sword'
	syrup: vt	'put syrup on obj.'
	typewriter: vi	'use typewriter' ("Can I typewriter on your typewriter?")
	vacuum-cleaner: vi	'use a vacuum cleaner'

(tabulated data from Clark 1993:101, 116-117, 200, 202, 204-205)

5. Pragmatic and Strategic Aspects of Productivity

5.1. Productivity versus Creativity: Another View

Clark's focus is on the practical need children have to fill gaps in their lexicon. From this functional perspective, she makes some interesting points about productivity in general. Clark bases her discussion of productivity on the assumption that "innovations offer the primary evidence for productivity" in word formation (1993:131). Innovations, according to Clark, occur for the purpose of filling gaps in the lexicon. In other words,

when a speaker does not know or cannot remember a word that expresses a certain meaning, one of the speaker's options is to form a new word. Clark's position is that the word formation processes relied on most frequently in these circumstances are the most productive derivational processes of a language. She maintains further that the types of morphological patterns found with most frequency in dictionaries and textual sources are not necessarily those which occur most frequently in on-line coinages and innovations. In fact, she observes, dictionaries and many text sources deliberately exclude innovations (1993:131).

Clark's functional approach to productivity contrasts with the view of productivity adopted by Lieber (see Section 3.3 above). The contrast between their views brings up an important point raised by Lieber's distinction between creativity and productivity: conventional usage is a key factor in determining the status of an item as a legitimate word of a language, but it is not a key factor in determining the productivity of a word formation process. Innovations are often short lived at best, and perhaps more often they are nonce forms. Once a speaker has created a new word, numerous factors besides the morphological processes used conspire to determine whether the word will eventually enter the conventional lexicon of the language. One such factor is blocking, the prior existence of a word in the conventional lexicon that fills the purpose. A speaker might use the innovative verb *to gift* to fill a lexical gap, but as long as its meaning competes with the meaning of the verb *to give*, it is unlikely that the innovation will enter the conventional lexicon of the language.

An excellent example of this problem is the use of proper names in zero derived verbs. Compare the verbs in the following series (examples from Clark and Clark 1979):

(13) a. to *boycott* the store (p. 774)

b. She *Houdinied* her way out of the closet (p. 784)

c. How I was *Robert McNamara'd* into submission (p. 785)[17]

(14) a. to *bench* the players (p. 772)

b. He *porched* the newspaper (p. 787)

c. We *housed* your wife's steak (p. 780; cf. in a restaurant "it's on the house!")

As Clark and Clark (1979) point out, the meanings of the innovative verbs in (13) depend on the speaker's and addressee's shared background knowledge of the people whose names form the base of the verbs. The verb *to boycott* (13a) has become conventionalized so that it is no longer necessary to know anything about Captain Charles C. Boycott (the victim of a 'boycott' in 19th century Ireland) in order to understand what the word means. In contrast, the usefulness of the verbs in (13b) and (13c) depends on the knowledge shared by speaker and addressee about Houdini and McNamara because the verbs derived from these names have not become conventionalized.

The innovative verbs in (14), on the other hand, require speaker and addressee to have more generic knowledge about the possible relationships between players and benches, newspapers and porches, steak and "the house." Furthermore, as I will propose in Chapter 5, the possible relationships between participants (represented by generic common nouns) in the conceptualization of the events in (14) are constrained by linguistic factors. Thus, I view the derivation of verbs from individual names, as a type, *less* productive than the derivation of verbs from generic nouns. It is only through conventional usage that verbs coined from individual names, like *boycott*, persist and change (to use Aronoff's words) to the point that the noun gains meaning apart from its original referent, becoming a common noun. Nevertheless, I take the fact that individual names are often used as bases for innovative zero verbs as indirect evidence that zero derivation is a highly productive word formation process in English. For if the language permits semantically opaque zero verbs to be created from individual names, then it surely must allow for the derivation of semantically transparent verbs from common nouns by the same process.

In English, a claim can be made that proper names are very productive as a base for zero verbs based on the frequency of occurrence as innovations. But there is also a sense that productivity depends to some extent on the potential for a newly derived word to become a conventional item of the lexicon. A creative application of zero derivation may result in a word whose meaning is unpredictable, and so it struggles to become widely accepted. This does not mean that the process of zero derivation is unproductive. In other words, it is not the process of zero derivation which results in the unpredictability of the meaning of a verb derived from a proper name.[18]

5.2. Labeling and Syntactic Recategorization

Like children, adults have strategic and practical reasons for inventing new words. Kastovsky (1986) presents two basic functions of neologisms: labeling and syntactic recategorization. The function of labeling is "to designate segments of extralinguistic reality" (1986:594), that is to fill a gap in the lexicon. This function is pragmatically constrained by the referents in the universe of discourse, as illustrated by the following example from Kastovsky (1986:594):

(15) The Time Patrol also had to *unmurder* Capistrano's great-grandmother, *unmarry* him from the pasha's daughter in 1600, and *uncreate* those three kids he had fathered.

The words *unmurder, unmarry* and *uncreate* reflect the type of coinage Clark (1993) refers to as innovations; they are coined to fill a semantic gap in the lexicon resulting from the science fiction/fantasy context. A well known example of a zero verb coined in a similar context is "*Beam* me up, Scotty!" from the television series "Star Trek."

Another kind of labeling is when people invent new words to fill a functional gap rather than a semantic gap in the lexicon. I would suggest that, in this regard, the productivity of the word formation process utilized is related to a sociolinguistic function of the coinage. One type of labeling is for group solidarity purposes; another is for commercial or entertainment purposes. Innovative words formed for group solidarity

purposes (e. g., slang and jargon terms) are often exclusionary; that is they are coined for use within the group. Consequently, the smaller and more closely knit the group, the less need there is for the innovation to be transparent or obey word formation rules which are productive by conventional standards (Cockney rhyming slang, for instance). Some attested uses of zero verbs in slang expressions illustrate that the meanings are often opaque:

(16) I'm gonna *dust* him. [eliminate him from the competition]
His teeth were all *sparked* out. [gold capped]
She didn't want to *dog* him. [be rude to him]
Don't *front* with me! [put up a false front]
He's *jailing*. [jailhouse fashion of wearing trousers low with shorts showing]
This jerk keeps *spamming* me. [sending junk e-mail]
He just *cadillacked* all day long. [relax]
I'm just *spitballing* here. [mentioning random ideas]
If it's not interesting, I start to *lamp* in the middle of class. [daydream]
I'm already *tooled* up. [high on drugs]

Coinages by advertising copy writers and mass media entertainers, on the other hand, tend to be inclusionary; that is, they are coined for the purpose of communicating with a wider and more diverse audience. As a result such coinages would be expected to conform more closely to conventional word formation rules and to be semantically transparent. Some innovative examples of this type of labeling with zero verbs are found in the news (17) and entertainment (18) media:

(17) a. They were *stretchered* away to safety. (local television news report)

b. Parents even have a constitutional right to *home school* their children. (Robyn E. Blumner, *St. Petersburg Times*)

c. . . . an Ozarks governor who preferred *wonking* health care and tax policy. (R. C. Longworth, *Chicago Tribune*)

d. . . . knowing that, with term limits, he could serve only eight years. . . . Most of the former governors running for the Senate are people who have been *term-limited* out of their preferred jobs. . . . Here, attending his final meeting of the Republican Governors Association was *term-limited* California Gov. Pete Wilson. (David Broder, *Washington Post*)

e. The collecting of the quotations . . . vulgarly known as blurbs has always been one of the book-publishing world's shadier practices.

Friends *blurb* friends and are later *blurbed* in return; publishers lean on their more famous writers to *blurb* the lesser lights on their lists. . . . "He's the best," Luntz *blurbed*, of his professional opponent. ("The Talk of the Town," *New Yorker*)

f. Teran also strains too hard for active verbs and winds up *verbing* too many nouns. (Jean Heller, book review)

g. Falen's translation is particularly admired by Douglas R. Hofstadter, who has himself recently *Englished* "Onegin." (Michael Dirda, *Washington Post*)

(18) a. He *lawyered* up. (television drama, *NYPD Blue*)

b. You get to *gondola* through the tunnels of Chicago. (mystery novel, *Tunnel Vision*, Sara Paretsky)

c. They spent two days *provisioning* the sailboat. (television program)

d. She *lessoned* herself to stop playing chess. (*Joy Luck Club*, Amy Tan)

e. Spenser's Tips for Successful *Gumshoe-ing*. (detective novel, *Sudden Mischief*, Robert B. Parker)

f. You made all the dishes and glasses *avalanche* out of the cabinets! (comic strip, *Curtis*, Ray Billingsly)

g. Who do you think you are, *loose-cannoning* around the city? (movie, *City Hall*)

h. Frank will be *jet-lagged*. (mystery novel, *I is for Innocent*, Sue Grafton)

i. That's right, he's a *regifter*! . . . If he can be a *regifter*, why can't you be a *degifter*? (television comedy, *Seinfeld*)

Of special interest is the use of the verb *to gift* as a base for the nominalizations in (18i).

Zero verbs are often used in mass advertising, frequently when the product name is the base noun. Lieber points out that advertisers use creative coinages to draw attention to particular elements of their message (1992:3). This is also the case when advertisers use generic nouns as the basis of zero verbs, and, like those used by the entertainment and news media, they tend to be semantically transparent:

(19) change the way you *channel* (Prevue channel)
the modern way *to office* (Kinkos)
How do I *telnet* to a remote server? (IBM)

the network that *outpoints* all rivals (NBC)
Supersize your meal (McDonalds)
the cracker that *snacks* like a chip (Nabisco)
It tills and *hills* (ad for garden equipment)

The second functional type of coinage identified by Kastovsky, syntactic recategorization, is a more subtle but probably more pervasive function of word formation. In Kastovsky's words, syntactic recategorization "nominalizes, verbalizes, adjectivalizes, or adverbializes sentences, thus transforming them into parts of sentences" (1986:595). On the approach of Hale and Keyser, the derivation of zero verbs is a prototypical example of syntactic recategorization, since the VP shell represents a small clause (see discussion in Chapter 3 above). The process of incorporation conflates the entire clausal structure ("sentence" in Kastovsky's terms) into one word, the zero verb. Functionally, the process of syntactic recategorization suggests that new words are created from existing words in order to refer to an idea stated or implied earlier in the discourse. In short, syntactic recategorization is a strategy for lexical cohesion (Halliday & Hasan 1976:291). The following examples offered by Kastovsky illustrate the strategic use of neologisms for syntactic recategorization (1986:595):

(20) a. He made *fists*. . . . He *defisted* to gesture.

b. If that's not *civil*, *civilize* it and tell me.

c. Solarians did not bud, they *birthed*; and the female was always the *birther*.

d. 'Don't you know a single person, who ought to be *murdered*?' —He wondered why his host should appear to set so much store by his acquaintance with potential *murderees*, but hardly liked to ask.

The repetitions here are notably similar to the repetitions found in the data from children (See the examples in (11), Section 4 above). A creative example of syntactic recategorization is found in the regifter-degifter routine from *Seinfeld* (18i). Syntactic recategorization is also evident in the examples cited above of the zero verbs *to term-limit,*

to blurb, and *to verb* (17d, e, f). Also consider *to English* a syntactic recategorization related to *translation* (17g).

Another observation by Kastovsky is that productivity can be defined in terms of both competence and performance. When it is defined in terms of competence, productivity has to do with "regularity," that is rule application and semantic transparency. When it is defined in terms of performance it has to do with frequency of application. The insight provided by Kastovsky's observation is that in some sense the more regular a word formation process is, the less "productivity" is an issue. This is one of the points at which syntactic rules and lexical rules diverge. As Kastovsky points out, "the 'productivity' of a syntactic rule at the level of competence is solely a question of the number of more or less idiosyncratic constraints, not of the frequency of actual application" (1986:593). Aronoff, too, mentions that "in syntax there are certain types of operations which are immune to questions of productivity. Such rules as Subject-Auxiliary Inversion, which are not optional in any sense of the term, cannot ever be thought of in terms of productivity" (1976:35).

The notion that complex derived words can stand for clauses (syntactic recategorization) suggests that there is a certain extent to which words formed for this purpose do not have to be stored in the lexicon. They can be formed and interpreted to serve a momentary function within a specific context. Thus, the words *murderees* and *defisted* in the excerpts above (20) are not likely to be listed in the reader's lexicon. The same can be said for the innovative zero verbs in (17), (18), and (19). As Kastovsky notes, the semantics and morphology must, to some extent, be considered separately:

> In the event of syntactic recategorization, the grammar in conjunction with certain properties of the base already predetermines a set of possible categories, such as agent nouns, action nouns, result nouns, relational adjectives, etc. . . . And consequently it does not make sense to talk of productivity at this [i. e., the semantic] level; rather, what is involved is the actualization of a grammatical possibility. The major difficulty here is the morphological level, or the prediction of how the respective semantic-syntactic category is realized morphologically. (1986:597)

In other words, the question becomes: What form will be used to create a new word in a certain semantic category (e. g., agent, process or result nominals, relational adjectives, and inchoative or locative verbs)? This approach puts the competence-performance issue into perspective. For if a language provides optional forms for a certain semantic category, then native speaker competence determines the form that will be accessed. The question of productivity arises when the language has competing forms for the same semantic category, but now the question becomes one of form only: Which of two (or more) competing forms will be used to perform the recategorization? On the assumption that there are relatively few semantic categories, semantic coherence is not the issue. Instead, on the assumption that recategorization serves a strategic communicative purpose, the issue is transparency. The more opaque the form, the less it is able to serve the strategic function of syntactic recategorization. Thus productive word formation processes tend to prevail when the derivation serves the strategic function of syntactic recategorization.

Labeling (i. e., filling a lexical gap), on the other hand, has the potential to be highly idiosyncratic, as the use of blends and acronyms, for example, demonstrates. Furthermore, it is much more likely that labels, once coined, will be entered in the conventional lexicon. Since the referent of the label exists in the universe of discourse, the need to use the label will recur as long as the universe of discourse remains relatively stable; and the label will have to be recalled each time that need arises. As long as there is a practical necessity for newly coined labels to be lexically stored, they can afford to have a more idiosyncratic form-meaning mapping.

6. Productivity and the Minimalist Lexicon

Each approach to productivity discussed so far has been based on a view of the lexicon as a dual entity consisting of the permanent lexicon and a dynamic subcomponent containing word formation rules. This is the standard pre-Minimalist view of the lexicon. Under Minimalism, however, the lexicon is unitary; it consists of a listing of lexical entries

containing idiosyncratic sound-meaning pairs (see Chapter 2 above). Strictly speaking, the Minimalist view of the lexicon contains no rule-governed subcomponent. The rules of word formation, like all rules of the grammar, are the province of the computational system. Individual lexical entries serve as the input to this rule-governed component of the grammar. The output of the computational system involves "the actualization of a grammatical possibility," to use Kastovsky's words (1986:597).

One result of the Minimalist view is that when a language permits optional forms for the same semantic relationship, there is nothing in the computational system to determine which form the output will take. That is why it is possible for competent native speakers of English, for example, to utter such non-standard or unconventional derived forms as:

(21) a. his *admittal* of the crime (cf. *admission*, television news anchor)

b. internet users are *incented* to keep up (cf. *given an incentive*, newspaper article)

c. serious about *co-educating* the university (cf. *integrating co-eds into the student body*, alumni magazine)

d. He's *seizuring* right now! (cf. *having a seizure*, veterinarian, news report)

e. *Re-Grand* Opening! (cf. *Grand Re-Opening*, Wal-Mart advertisement)[19]

f. We continue to *grow* our graduate student population, including masters degrees and doctorates. (cf. *increase*, *expand*, University of Florida president John V. Lombardi)

g. This is not the type of law any legislator should *knee-jerk support*. . . (cf. *give knee-jerk support to*, Florida attorney and lobbyist Roy Glass)

h. I'm *cowered* by it (cf. *I cower before it*, New York Mayor Rudolph Giuliani)

i. If your *giftee* is a word specialist . . . try this dictionary. (cf. *the recipient of your gift*, William Safire, *New York Times Magazine*)[19]

In the Minimalist system, the grammaticality of each of these utterances is determined by the selectional criteria in the lexical entry of the italicized words and affixes in the mental lexicon of each speaker.

Similarly, in the Minimalist view, the computational system does not determine whether a speaker will say "*encode* the communique" versus "*code* the communique" or "*hospitalize* the survivors" versus "*hospital* the survivors." It does not even determine whether either of these ideas is expressed periphrastically: "put the communique into code" or "put the survivors in a hospital." Consequently, the relative productivity of one word formation process compared to another applies to form only. This is precisely the point made by Kastovsky (1986; see Section 5.2 above), foreshadowing by nearly a decade the Minimalist view. Furthermore, the preference for one competing form over another is a matter of convention, independent of the computational system.

In short, I conclude that productivity is basically an extralinguistic issue. The key factors involved are frequency and structural transparency. Frequently used forms are learned quickly, and because of repetition, they have more longevity than seldom used forms. Structurally transparent forms are also acquired earlier and faster than opaque word forms. The computational rules of word formation take no account of the interpretability, which is a condition on the output. With Minimalism, we achieve the goal sought by Lieber: "the rules of word formation *are* in fact the rules of syntax" (1992:vii). The task remaining is to show how the "rules of syntax," that is the computational system, together with an economic view of the lexicon, can account for the formation of various categories of denominal verbs.

Notes

1. To be precise, Baayen and Lieber's formula was not a simple type-token ratio, but was adjusted for the number of hapax legomena, i. e., the number of tokens which occurred only once. This adjustment was meant to reflect the likelihood that a word formation process would be used to create a new word. For discussion see Baayen & Lieber 1991:809 ff.

2. Baayen and Lieber found 85 types of denominal verbs in *–ize*, 40 in *en–*, 33 in *–ify*, 32 in *de–*, and 5 in *be–*, for a total of 195 denominal verb types (1991:822).

3. Orthographically, however, the base is clearly discernable in the affixed form (e. g., *logic*ian).

4. Some words in *–al* with the same base can have different meanings, e. g., *tribal gang / tribal art*; *institutional green / institutional racism*.

5. This is, of course, an overgeneralization. The data in this example (3) have been skewed in order to illustrate the difference between transparency and coherence. The fact that I had to skew the data to make the point indicates that there are problems with the concept of coherence. These will be addressed below.

6. The only exceptions I know of in current usage are *enslave*, *entitle*, and *envisage*.

7. This could also be considered two different meanings: (a) 'cause Obj. to be like X' and (b) 'cause Obj. to become X.'

8. Note that many of the verbs in *–ize* can be paraphrased 'put Obj. in X' (cf. *en–*): *jeopardize* 'put someone in jeopardy,' *categorize*, 'put some things in categories,' etc.

9. A similar view is presented by Fabb (1988), who also notes that the morphological structure of the base restricts subcategorization of affixes.

10. This argument structure would be inherited by the derived verb, in Lieber's theory (cf. her discussion of inheritance, 1992:116 ff.).

11. In the same footnote, Lieber restates her claim that *new* verbs in *–ize* will not have internally assigned theta roles, but in fact the counter-examples, *computerize, motorize* and *hospitalize*, are all modern 20th century coinages.

12. See Hale and Keyser's discussion of the transitive-inchoative alternation with deadjectival verbs (1998:84-85).

13. As a point of interest, Hale and Keyser, like Lieber, consider productivity—including the productivity of zero verbs—a matter of subcategorization or selectional criteria (1998:106).

14. Lieber's perception of the oddness of the verb *to impact* (meaning 'to have an impact on') is not due to blocking. The prescriptivistist and purists who react negatively to this verb also reject such verbs as *to input* (e. g., *the data will be inputted by Monday*), zero derived from the noun *input*.

15. As a practical matter, when children are at the earlier two-word stage, it is difficult to determine the parts of speech in their utterances because they have not yet acquired complete inflectional morphology or the combinatory parameters of their language. An example cited by Clark is the child who says "[ə] door" or "Door, door please," perhaps using *door* to mean 'open' (1993:38). However, it is impossible to

determine whether or not this child has created a zero verb *to door* because the syntax of the utterance is not sufficient to determine what part of speech *door* is.

16. According to Clark, "the *be–* on Dutch denominal verbs adds a sense of 'X is at or in a place'" (1993:206).

17. From the title of a Simon and Garfunkle song "A Simple Desultory Philippic (Or How I Was Robert McNamara'd Into Submission)," lyrics by Paul Simon, 1966.

18. Some recent attested examples illustrating the ambiguity of zero verbs derived from proper names are:

He *Lewinskied* her / She *Lewinskied* him
Lani Guinier got *Borked* / You're *Borking* the issue
His lawyers *OJed* his defense (accused the police of racism) / She got *OJed* (killed) with a corkscrew
This guy has *Gottied* himself up (dressed very sharply; cf. *mobbed up* 'connected to organized crime')
My cell phone has just *Peroted* (quit unexpectedly)
She threatened to *Bobbit* him (derived from the name of the perpetrator or the victim?)

19. Typically, the prefix *re–* (21e) and the suffix *–ee* (21i) both attach to verbs.

CHAPTER 5
THEMATIC RELATIONS

1. Introduction

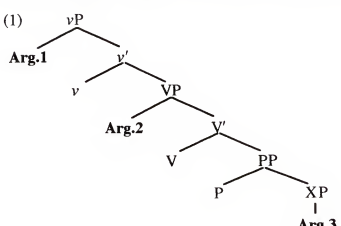
In this chapter, I will outline a general proposal for the derivation of transitive zero verbs as a strictly syntactic process. This approach is based largely on the work of Hale and Keyser (1993, 1997, 1998; see Chapter 3 above), but unlike Hale and Keyser, I do not propose a lexical level of syntax distinct from a sentential level of syntax. Instead, I take the Minimalist view that there is one unified computational component of the language faculty, and that the lexicon provides the input to this computational system, with no interface between them. Consequently, my view is that zero verbs are productively derived in the computational system from concrete nouns listed in the lexicon. In order to support this view, I will argue that there are systematic constraints on the interpretability of transitive zero verbs. To approach this issue, I will rely on the concept of thematic roles; that is, the idea that the participants in an event have unique semantic relations with respect to each other. Since my overall focus is on transitive zero verbs, I will be dealing in this chapter with the thematic roles of three event participants: the roles of the subject and object (i. e., external and internal arguments) of the derived verb and the role of the base noun from which the verb is derived.

I follow Hale and Keyser's original model for the conflation structure of transitive zero verbs (1993), assuming that they are derived in a VP shell configuration which represents a triadic argument structure. As discussed in Chapter 3, Hale and Keyser later modified the VP shell conflation structure by eliminating the lower VP and adding a specifier position to the PP (1997, 1998). While there are valid motivations for this

modification (see Chapter 3, Section 5.2 above), I have chosed to represent the conflation structure of zero verbs with a traditional VP Shell structure throughout the remainder of this dissertation. This choice reflects the standard view that "the *v*–VP configuration can be taken to express the agentive or causative role of the external argument" (Chomsky 1995:315). However, I see no reason why a *v*–PP configuration, as proposed by Hale and Keyser (1997, 1998), could not also be taken to express the agentive thematic role (cf. Harley & Noyer 1998). In fact, there is practically nothing in the analysis to follow that would be altered using a *v*–PP configuration rather than a *v*–PP configuration.[1]

The diagram in (1) illustrates the three argument positions in the VP shell structure (cf. Larson 1988). In the conflation structure of transitive zero verbs proposed by Hale and Keyser (1993), the underlying subject (external argument) of the derived verb is Argument 1, the direct object (internal argument) is Argument 2, and the base noun from which the verb is derived originates in the Argument 3 position, as diagrammed in (1):

(1)



As discussed in Chapter 3 above, Hale and Keyser have proposed that the thematic roles associated with the subject and object of the derived verb are configurationally defined, but they do not associate a thematic role with the structural position of the base noun. My idea that the base noun has a thematic role in the event denoted by the derived verb is based in part on the taxonomy of zero verbs developed by Clark and Clark (1979; discussed in more detail below). The idea that the base noun has a thematic role is also

based in part on the analysis of Hale and Keyser, since they describe the conflation structure of zero verbs as an argument structure with the base noun originating in an argument position. Consequently, the base noun must have a thematic role if the verb is derived in the computational system, since "an argument with no θ-role is not a legitimate object, violating Fl and causing the derivation to crash . . ." (Chomsky 1995:347).

In a Minimalist approach, there are basically two ways to assure that an argument will have a thematic role—either the role is assigned configurationally or it is assigned lexically. Configurational assignment of a thematic role means that an argument receives its role solely by virtue of its position in a syntactic structure (see Chapter 3, Section 3 above). By lexical assignment of a thematic role, I mean that an argument receives its role by merging with a head that has a lexically listed theta-assigning feature. If a thematic role is assigned lexically it is idiosyncratic, whereas if a thematic role is assigned configurationally it is predictable from the syntactic structure.

In this Chapter, I will discuss the problems encountered in the analysis of zero verbs when taking either a completely lexical approach to the assignment of thematic roles or a completely configurational approach. I begin in Section 2 with a semantic classification of zero verbs according to two basic thematic roles that the base noun can have—Theme or Goal. Taking the view that the base noun can have one of these two thematic roles, I proceed in Section 3 to point out the difficulties in applying a strictly configurational approach to the conflation structure of zero verbs. In Section 4, I present an argument for assignment of the roles Theme and Goal as a lexical property of prepositions in English, suggesting that these two roles result from an inherent binary feature associated with the abstract preposition in the conflation structure. In Section 5, I outline a proposal involving both configurational and lexical assignment of thematic roles which accounts for constraints on interpretability of zero verbs. I conclude in Section 6 with a brief discussion of how this approach to thematic role assignment relates indirectly to the productivity of zero verb formation.

2. Two Thematic Classes of Zero Verbs

The idea that thematic relations are involved in the derivation of zero verbs stems from the taxonomy of zero verbs developed by Clark and Clark (1979:770-777). They sorted over 1000 zero verbs into five main categories based on the thematic roles of the base noun (see Appendix):

(2)

CATEGORY	*NUMBER*
Location: bottle the wine	160
Locatum: saddle the horse	336
Instrument: hammer the nail	313
Goal: coil the rope	112
Agent: umpire the game	85

I have chosen to focus on the four most productive categories,[2] which are broadly defined as follows: *Location* verbs generally have a locution 'put X in/on N' where N is the base noun representing a locational Goal, and X is the direct object of the derived verb having a thematic relation of Theme in reference to N. *Locatum* verbs have a contrasting locution 'put N in/on X' where N is the base noun representing an object moved (Theme), and X is the direct object of the derived verb having a thematic relation of Goal in reference to N. *Instrument* verbs have a locution 'use N on X' where the base noun is an Instrument used to affect the direct object. *Goal* verbs generally have a locution 'make X into/like N' in which the base noun represents a figurative Goal of the action performed on the direct object. Examples of verbs in each category follow:

(3)

a. *Location verbs:*
bottle the wine
shelve the books
corral the horses
box the groceries

b. *Figurative Goal verbs:*
coil the rope
pile the dirt
orphan the children
powder the aspirin

c. *Locatum verbs:*
saddle the horse
paint the house
spice the food
label the boxes

d. *Instrument verbs:*
hammer the nail
elbow the passengers
xerox the article
anchor the boat

I have previously argued that these four categories of transitive zero verbs can be reduced to two more general classes based on basic definitions of the thematic roles Theme and Goal (Tyler 1996:55-60, 1998:57-58). In general, I define Theme as an object undergoing motion in the expression of an event, and I define Goal as the target of the movement. Given these basic definitions, I maintain that verbs in the Location and figurative Goal categories (3a, b) are similar to each other, and that verbs in the Locatum and Instrument categories (3c, d) are likewise similar to each other.

Both Instrument and Locatum verbs have a base noun which represents an object in motion with respect to the direct object. In other words, an instrument is an object that undergoes motion toward a target, the object of the action. The semantic similarity between Locatum and Instrument verbs is evident in numerous examples of ambiguity between the categories. Verbs like *to glue the pages* or *to cork the bottle*, for example, may be interpreted as either Instrument or Locatum verbs. In short, both Locatum and Instrument verbs are derived from nouns which have a Theme role in relation to the direct object of the derived verb, and the object has a Goal role in relation to the base noun.

Likewise, the verbs in Clark and Clark's Goal category are similar to Location verbs. The base noun in the Goal category is a figurative goal, and these verbs can be paraphrased as 'cause X to become N,' or 'cause X to be like N.' These locutions indicate that the base noun (N) of a verb in this category represents the resultant state achieved by the direct object (X) in the event described by the derived verb. The role of the base noun can usually be expressed by the locution 'turn X into N,' where the preposition *into* marks a Goal argument (cf. Walinska de Hackbeil 1986:318). In other words, while the base noun of a verb in Clark and Clark's figurative Goal category does not necessarily represent a locational goal, it does represent the target of movement or change of the direct object. The change may be physical (i. e., motion), as in *coil the rope*, or internal, as in *orphan the children*. Thus, the category Clark and Clark identify as Goal verbs, like verbs in the

Location category, are derived from a base noun that has a basic Goal role with respect to the affected object, and the affected object has a Theme role with respect to the base noun.

Based on this analysis, I have concluded that there are actually two classes of transitive zero verbs, defined in terms of the basic thematic role of the base noun in the event instantiated by the derived verb: the Goal class, which includes Clark and Clark's Location and Goal categories, and the Theme class, which includes the Locatum and Instrument verb categories (Tyler 1998a:58):

(4) a. *Goal verbs*: Base $\text{Noun}_{\text{GOAL}}$, Affected $\text{Argument}_{\text{THEME}}$
$\text{bottle}_{\text{GOAL}}$ the $\text{wine}_{\text{THEME}}$
$\text{coil}_{\text{GOAL}}$ the $\text{rope}_{\text{THEME}}$

b. *Theme verbs*: Base $\text{Noun}_{\text{THEME}}$, Affected $\text{Argument}_{\text{GOAL}}$
$\text{saddle}_{\text{THEME}}$ the $\text{horse}_{\text{GOAL}}$
$\text{hammer}_{\text{THEME}}$ the $\text{nail}_{\text{GOAL}}$

These two classes represent over 90 percent of the transitive zero verbs identified and categorized by Clark and Clark, indicating that the thematic roles Theme and Goal have widespread applicability in analyzing the semantics of zero verbs. In short, the basic relationship between Theme—an object undergoing motion or change—and Goal—the target of motion or change—defines the fundamental grouping of transitive zero verbs into two semantic classes. Henceforth, I will use the term *Goal verbs* in referring to the categories identified by Clark and Clark as Location and Goal verbs, and I will use the term *Theme verbs* in referring to the Locatum and Instrument categories.

Defining the classes of zero verbs in terms of the thematic roles of the base noun and direct object raises the question of how the thematic roles are assigned. In the next section, I discuss the configurational approach to theta role assignment. I will show that a configurational approach using the roles Theme and Goal for direct object and base noun is not applicable to the conflation structure of zero verbs. This conclusion will result in an eventual revision of the analysis illustrated in (4). In Section 5.2, I will propose that the roles Theme and Goal apply to the base noun only, and not to the direct object of the verb.

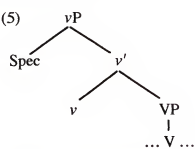
3. Configurational Approaches to Thematic Role Assignment

3.1. Configurational Definition of Agent

In *The Minimalist Program*, Chomsky adopts a configurational approach for the assignment of the external argument (the underlying subject) of transitive verbs, stating that in a VP shell configuration such as (5),

> The internal arguments occupy the positions of specifier and complement of V. Accordingly, the external argument cannot be lower than [Spec, *v*]. If it is [Spec, *v*], as I will assume, then the *v*–VP configuration can be taken to express the causative or agentive role of the external argument. It would be natural to extend the same reasoning to transitive verb constructions generally, assigning them a double-VP structure as in [(5)], the agent role being understood as the interpretation assigned to the *v*–VP configuration (1995:315).

(5)



In short, Chomsky defines the Agent (or Causer) role of a transitive verb by virtue of its position as specifier of *v*P in a VP shell structure.

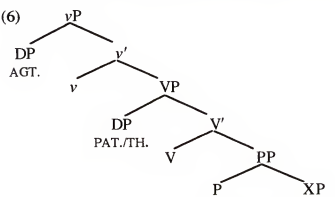
As for the internal arguments (the specifier and complement of VP), however, Chomsky is less precise about how they receive thematic roles. In fact he does not discuss them at all, merely noting that "further questions arise when we turn to verbs with complex internal argument structure, which I am ignoring here" (1995:359). Furthermore, while stating that "an argument lacking a θ-role is illegitimate, violating FI and causing the derivation to crash," he concludes that "the question of assignment of θ-role remains open" (1995:363). This leaves open the possibility that some thematic roles may be assigned lexically rather than configurationally. However, in his discussion of the lexicon Chomsky never mentions thematic roles. Nevertheless, others working in the Minimalist framework

have adopted a lexical approach to theta role assignment (e. g., Radford 1997:327-328). Under such an approach, the internal arguments of a verb are assigned thematic roles depending on idiosyncratic features listed in the lexical entries of the verb.

3.2. Configurational Definition of Patient

In the configurational approach to thematic relations described by Hale and Keyser, two structural positions in the VP shell are associated with thematic roles. They define the position of the specifier of a causative light verb (*v*P) in a VP shell structure as having an agentive role (1993:69), and they define the position of the specifier of the complement (VP) of the light verb as having a Patient (or Theme) role (1993:72).

(6)



As summarized in Chapter 3, Section 3.1 above, Hale and Keyser refer to the specifier of VP in this configuration as the "subject of a predicate of change" (1993:71) since the argument in this position undergoes some kind of change (caused by the Agent, specifier of *v*P) to the resultant state represented by the complement of V.[3] In other words, the complement of V represents a predicate of change, and as such its specifier is by definition the subject of a predicate of change. Consequently, an argument in this position is an affected argument, having the role often labeled Patient, defined as the entity undergoing the effect of some action.[4]

To summarize, Hale and Keyser's configurational approach to thematic relations accounts for the roles of two arguments—Agent and Patient—but there is a gap in the model when applied to verbs with three arguments since there is no thematic role assigned

to the third argument position (XP in (6)). Nevertheless, Hale and Keyser recognize that this is an argument position in the argument structure of triadic verbs like *put* and *give*. Furthermore, they have consistently assumed that the conflation structure of zero verbs is identical to the argument structure of triadic verbs.

Hale and Keyser briefly discuss the situation with triadic verbs like *give*, which occur in both dative and double object constructions (1997:44-46):

(7) a. *Dative*: give a book to John

b. *Double Object*: give John [P] a book

They maintain that both VPs in (7) have the argument structure diagrammed in (6), and that the only difference between them is the choice of preposition (1997:45).[5] Hale and Keyser propose that the dative alternant occurs with an overt preposition of "terminal coincidence" (*to* in (7a)), with the meaning that some entity (*a book*) moves to a target or recipient (*John*). In contrast, they propose that the double object alternant occurs with a phonologically null preposition of "central coincidence" (indicated by [P] in (7b)), with the meaning that some entity (*John*) comes to have or be with another entity (*a book*). In short, Hale and Keyser take a lexical approach to the thematic roles assigned to the third argument in these constructions, since they view these roles as being determined entirely by the choice of preposition (see additional discussion in Section 4 below). As a result, they conclude that "the dative and double object constructions . . . are not related transformationally" (1997:45). In other words, according to this view, there is no sense in which the double object alternant is syntactically (or computationally) derived from the dative (or vice versa). Instead, apparently, information provided in the lexical entry of the verb *give* permits its collocation with either of the two prepositions described above.

This is a very simple and straightforward way of accounting for the dative/double object alternation. For one thing, it emphasizes the very lexical, idiosyncratic nature of the alternation, since not all dative verbs can alternate in this way. Furthermore, the semantic similarity of the dative and double object constructions is accounted for on the basis of the

semantics of the verb, while the difference is due to the choice of preposition. However, this lexical approach to the dative/double object alternation does not explain certain syntactic patterns that have been observed in the literature. For example, the effects of quantifier binding support the view that the double object structure is derived from the dative structure (Larson 1990, Aoun & Li 1993):

(8) a. John assigned one problem to every student (ambiguous)

b. John assigned one student$_i$ every problem $\mathbf{t}_i$ (unambiguous)

Briefly, the ambiguity of (8a) results from the fact that the universal quantifier *every* does not have scope over the NP *one problem*. However, even though the universal quantifier has the same surface position in (8b) that it has in (8a), (8b) is not ambiguous. This difference is accounted for by the syntactic movement of the NP *one student* from an underlying position (represented by **t** in (8b)) that is within the scope of the universal quantifier. In short, evidence from quantifier binding supports a view that the relationship between dative and double object structures is transformational, and not simply lexical, contrary to the position taken by Hale and Keyser. Moreover, this evidence supports the view that the dative structure (8a) is basic and that the double object structure (8b) is derived.

3.3. Configurational Definition of Theme and Goal

The most clearly articulated version of a configurational approach to theta role assignment is Baker's Uniformity of Theta Assignment Hypothesis (UTAH). Originally formulated in pre-Minimalist terms, the UTAH states that "identical thematic relationships between items are represented by identical structural relationships between those items at the level of d-structure" (1988:46). A more recent version of UTAH specifically defines thematic roles in terms of the positions of arguments in a VP shell structure (Baker 1996b:226; cf. 1996a:29):

(9) *Uniformity of Theta Assignment Hypothesis:*
Thematic roles are assignedto the following VP shell positions:
a. Theme to the specifier of the minimal VP;
b. Goal (more generally, Path) to the complement of the minimal V;
c. Agent outside the minimal VP (typically to the specifier of *v*P).

This hypothesis establishes exactly one pattern for linking thematic roles to the positions where arguments of a verb are merged in syntax. Note, too, that in Baker's view, arguments with the Theme (or Patient) role are merged higher than those with a Goal role, establishing the following canonical hierarchy of thematic roles:

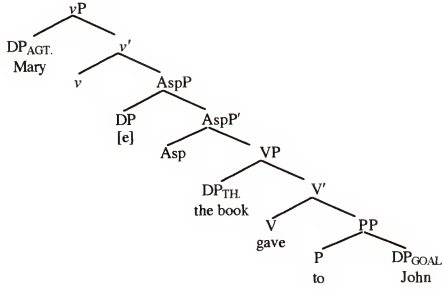
(10) Agent > Theme/Patient > Goal/Path

There is an elegant perspicuity to this version of UTAH because, as Baker points out,

> Interestingly, X′ theory traditionally defines exactly three types of positions with respect to a head: complement of the head, specifier of the head, and positions outside of the projection of the head. If the role of the thematic hierarchy is to associate semantic arguments of a head with syntactic positions, and there are three such positions available, it makes sense that the hierarchy should distinguish exactly three categories. (1996a:28)

For the dative/double object alternation with triadic verbs like *give*, Baker's configurational approach to theta assignment requires that the double object structure is syntactically derived from the dative structure (cf. Den Dikken 1995). Baker gives the following configuration for the dative structure (1996a:19):

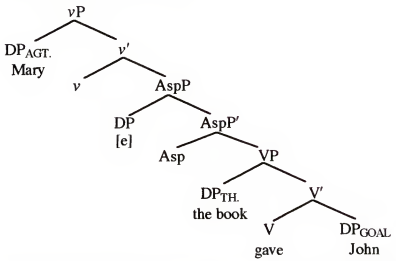
(11) Mary gave the book to John



The primary difference between this structure and the VP shell in (6) is the appearance of Aspect Phrase between the upper and lower verb phrases. The dative sentence (11) is derived simply by raising the head V successively to Asp and *v*. The specifier position of the Aspect Phrase remains empty.

For the double object alternant, Baker proposes the following structure (1996a:20):

(12) Mary gave John the book

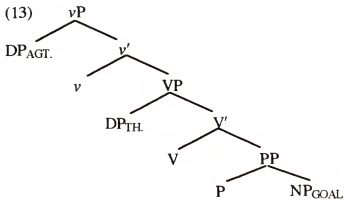


The main difference between the dative (11) and double object (12) structures is that the Goal argument in the latter is a DP rather than a PP. As a result this argument must raise to a functional category for case purposes, and Baker proposes that it raises to the specifier of the Aspect Phrase. The movement of the head verb in the double object sentence is the same as in the dative sentence.

Baker provides a transformational analysis of the dative/double object alternation with triadic verbs like *give* using a highly articulated configurational approach to thematic roles. However, this approach is not applicable to the conflation structures of Location and Locatum verbs for a number of reasons. First, because Location and Locatum verbs are formed by a process of noun incorporation, there is a problem with the occurrence of Aspect Phrase between the two verbs of the VP shell structure. As pointed out in Chapter 3, Section 2.1, noun incorporation is blocked if a functional head intervenes between

lexical heads (see Li 1990:406). This problem could conceivably be solved by deleting AspP from the structure Baker proposes for dative/double object verbs, providing a simpler conflation structure for transitive zero verbs:

(13)



This structure provides a straightforward assignment of thematic roles for the derivation of Location verbs like *shelve* and *bottle*, assuming that the base noun in such verbs has a role of Goal (compare to (4a)):

(14) We$_{AGT.}$ bottled$_{GOAL}$ the wine$_{TH.}$
They$_{AGT.}$ shelved$_{GOAL}$ the books$_{TH.}$

Accordingly, the base noun (*bottle, shelf*) raises successively by head-to-head movement in the structure (13) to derive the sentences in (14).

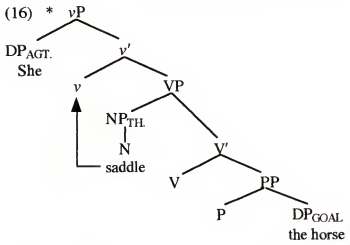
However, if we assume that Locatum (and Instrument) verbs are derived from a base noun with the role of Theme as proposed in Section 2 above, then the configurational approach of Baker (as modified in (13)) is inapplicable:

(15) She$_{AGT.}$ saddled$_{TH.}$ the horse$_{GOAL}$
He$_{AGT.}$ painted$_{TH.}$ the house$_{GOAL}$

Baker's configurational assignment of thematic roles would predict that Goal verbs are the only possible class of zero verbs, since Goal is the most deeply embedded thematic role. The problem is that if the argument with a Theme role (i. e., the base noun) originates in the specifier position of VP, according to Baker's UTAH as shown in (13), then it cannot incorporate, because incorporation involves movement of heads only, not specifiers (under

the Head Movement Constraint; see Chapter 3, Section 2.1 above). As a result, the following conflation structure for the Theme class of zero verbs is barred:

(16) *



The only solution to this problem on a configurational appoach to theta assignment would be to assume that Location and Locatum verbs do not both involve the roles Theme and Goal. Suppose, for example, that Location verbs do involve the roles Theme and Goal as illustrated in (17a), but that Locatum verbs involve something else, say Theme and Other (17b):

(17) a. $We_{AGT.}$ $bottled_{GOAL}$ $the\ wine_{TH.}$

b. $She_{AGT.}$ $saddled_{OTHER}$ $the\ horse_{TH.}$

The problem with this solution is that on a configurational approach, the role "Other" would require a configurational position distinct from the positions of Theme and Goal. This would mean that the conflation structures of Location and Locatum verbs would have to be different.[6] However, Hale and Keyser have demonstrated quite convincingly that Location and Locatum verbs are both formed on identical conflation structures. Were they formed on different syntactic structures, we would expect them to behave differently syntactically, but they do not (Hale & Keyser 1993:97; see discussion in Chapter 3, Section 2.2 above).

The foregoing discussion indicates that a strict configurational approach to thematic relations as proposd by Baker (1996a, b) cannot be applied to the conflation structure of

zero verbs. Although a configurational approach has advantages for the analysis of the dative/double object alternation with verbs like *give*, it appears that for zero verbs, at least, Hale and Keyser's lexical approach has some merit. We must conclude, along with Hale and Keyser, that the semantic distinction between Locatum and Location verbs is not due to a difference in structural representation, but is instead due to a difference in the lexical-semantic properties of the abstract heads occurring in the conflation structures.

4. Universal Lexical Properties of the Category Preposition

The proposal to be offered here is that the basic semantic difference between the Theme and Goal classes of zero verbs verbs is due to the thematic relations between the base noun and the DP which occupies the specifier position of the lower VP in the conflation structure. These semantic relationships can be seen in the fundamentally different meanings associated with typical verbs in each class, especially in the distinction between Location and Locatum verbs:

(18) a. *Location verb*: shelve the books

b. *Locatum verb*: saddle the horse

Hale and Keyser compare the abstract V and P heads in the conflation structure to distinct verbal locutions: 'provide-with' for Locatum verbs and 'put-in/on' for Location verbs (1993:56, 62). More specifically, Hale and Keyser suggest that the abstract P can represent one of two basic relationships:

> The recognized and real distinction between location and locatum verbs is not one of structure, we maintain, but derives from the fundamental nature of the inner head. . . . It is a characteristic of P . . . that it distinguishes "terminal" and "central" coincidence. This is an opposition which is pervasive in grammar, in fact (cf. Hale 1986, for a disucssion of this in Warlpiri grammar). In [(18a)], exemplifying terminal coincidence, the incorporated, or conflated, nominal (*shelf*) represents an "endpoint" of motion or transfer on the part of the entity denoted by the variable argument (*the books*); in [(18b)], on the other hand, the incorporated argument (*saddle*) corresponds to something which the entity denoted by the variable argument (*the horse*) comes temporarily or permanently to "have" or to "wear" or to "be with". This we associate with central coincidence (1998:87).

In other words, while both categories of zero verbs have the same conflation structure, Hale and Keyser suggest that the difference between them is due to a lexical property of the abstract P head in the conflation structure. Nevertheless, Hale and Keyser do not discuss the semantic difference between Location and Locatum verbs in terms of thematic roles.

> In our view, thematic roles are not a part of the basic vocabulary of the theory of argument structure. Were they indeed a part of that vocabulary, we would be hard put to argue one way or the other about the proper association of the "theme" role in the argument structure of locatum verbs—it makes perfect sense to say of either the horse or the saddle in *saddle a horse* that it is the theme (1997:36, fn. 6).

However, I will argue that the ability of native speakers to distinguish between Locatum and Location verbs, and between the general classes of Theme and Goal verbs, can be supported by an analysis in which *horse* and *saddle* do have distinct thematic roles.

Building on the idea that the abstract preposition in the conflation structure can have different lexical properties, I propose that for zero verbs in the Goal class, P has a feature [–central], and it assigns the role Goal to its complement. For zero verbs in the Theme class, on the other hand, the abstract P has the feature [+central], and it assigns the role Theme to its complement. The binary nature of the feature associated with P reflects the suggestion by Hale that the semantic opposition *central* versus *non-central* (or *terminal*) coincidence is a universal distinction associated with various grammatical functional elements of languages (1986:238). In English [±central] is a feature primarily associated with the category preposition, so that every preposition whether overt or phonologically null should have this feature.[7] Assuming that the feature [±central] is universal, I suggest that it is an interpretable feature, like [±past], which, in Minimalist terms, is specified positive or negative in the transition to the numeration (cf. Chomsky 1995:236-238).

Associating a feature designation to the category preposition raises two technical issues. First is the question of whether prepositions are a lexical or functional category.[8] I think there are good arguments in support of its functional status, particularly because it is a closed category (see Beard 1995:240 ff. for a good summary). However, in the conflation

structure of zero verbs, if prepositions are considered a functional category, then this would violate the constraint that functional nodes cannot be incorporated between lexical heads (Li 1990:406). The other question raised by the association of the [±central] feature with prepositions has to do with feature checking in a Minimalist framework. However, if P is a lexical category and [±central] is a semantic rather than a formal feature, then feature checking is not required. I will leave these technical issues unresolved here, assuming that they can be resolved in a manner consistent with basic principles.

There is additional research which indicates that [±central] is a universal binary feature associated with prepositions in languages which have the category preposition. Croft (1991:185) makes a basic distinction between "antecedent" and "subsequent" prepositions or case markers. In English, the antecedent prepositions are *with* and *by*, among others, generally conforming to Hale and Keyser's designation of central coincidence. The subsequent prepositions are *to*, *for*, and other spatial path prepositions, generally conforming to the prepositions of terminal coincidence in Hale and Keyser's typology.

Croft's terminology is based on a force-dynamics view of event structure somewhat similar to Hale and Keyser's 1993 outline of semantic relations in the VP shell structure (discussed in Chapter 3, Section 3.1 above). Croft views the complex events instantiated by triadic verbs as a causal chain: a force is exerted by entity *x* upon entity *y*, with the result that *y* is moved or changed in reference to entity *z*. In short, the matrix event is a causal relationship between *x* and *y*, and the subevent is a change in the relationship between *y* and *z* (see also Pustejovsky (1992) for a similar approach to event structure). Such a force dynamic interpretation is exemplified by the verbs *put* and *spray*:

(19) John-*x* put the books-*y* on the shelf-*z*

(20) a. Mary-*x* sprayed paint-*y* on the wall-*z*

b. Mary-*x* sprayed the wall-*z* with paint-*y*

As is evident in (20), the arguments of a triadic verb do not always surface in the same

order as their occurence in the causal chain. According to Croft, this is due to profiling, a process of event construal (1998:39). In (20a) the three arguments occur in the canonical order reflecting the force dynamic event structure, with the subevent argument (*wall*) following the matrix event argument (*paint*). Thus, *wall* is expressed as an oblique with the subsequent preposition *on*. In (20b) on the other hand, the subevent argument (*wall*) is profiled so that it precedes the matrix event argument (*paint*), and the antecedent preposition *with* is used to express the oblique.

Croft's approach to event structure lends support to the association of a semantic feature [±central] with the category preposition. The negative, or unmarked, value of the feature occurs when the arguments in the expression of an event take the same ordering that they have in the causal chain, that is the canonical order. Thus, the subsequent prepositions in Croft's model generally correspond to the relationship of terminal coincidence in Hale and Keyser's analysis and to the feature I designate as [–central]. The positive, or marked, value of the feature occurs when the expressed ordering of arguments is different from their order in the causal chain. Thus, the antecedent prepositions in Croft's model generally correspond to the relationship of central coincidence defined by Hale and Keyser and to the feature I designate as [+central]. A comparison of my approach using semantic features and the analyses of Hale and Keyser and Croft is as follows:

(21) Prepositions	*with, by*	*to, in, for*
Causal chain oblique (Croft)	antecedent	subsequent
Coincidence (Hale & Keyser)	central	terminal
Feature designation	[+central]	[–central]

To support the view that the binary opposition between subsequent and antecedent prepositions (or case markers) is universal, Croft presents evidence on the marking of oblique arguments in forty languages (1991:187-188). Hale, too, in his original discussion of the inherent opposition between central and terminal coincidence, suggests that it is universal. He points out that the opposition is not uniformly marked morphosyntactically, which makes it "difficult, if not impossible, to learn on the basis of the data which a

language learner would have in the normal course of language acquisition, suggesting that the semantic opposition is universal" (1986:238). Furthermore, acquisition data reported by Croft (1998:40) indicate that English speaking children recognize opposing classes of prepositions but make errors in selecting the correct form from the appropriate class. For example, a child might use the preposition *by* instead of *with* (both expressing central coincidence) in an instrumental context:

(22) I just eat it by my spoon (from Bowerman 1983:465)

Acquisition data like this suggests that the feature [±central] can serve as a licensing feature for late insertion of a phonological matrix in a distributed morphology approach, under the assumption that while the binary feature is universal, the phonological forms associated with the value of the feature are lexically acquired. In addition, it is reasonable to suppose that distinct phonological forms, having distinct lexical entries, would also have some idiosyncratic semantic or selectional features even if they share the same [±central] value. However, I would argue that the abstract, phonologically null preposition that occurs in the conflation structure of zero verbs has only one semantic feature, that is [±central].

That there is a universal opposition associated with the category preposition gives a strong indication that there is a semantic feature, characterized here as [±central], involved in theta role assignment. The notion of associating semantic features with abstract categories to account for thematic relations is not unprecedented in the literature. In a similar vein, Harley and Noyer (1998:125) have suggested that the abstract light verb *v* has a lexical feature [±cause], and that with a positive value it projects a specifier position, creating an agentive (transitive) context. Regarding the feature [±central], however, I have not associated it with a structural alternation (e. g., projection of a specifier), but merely with a basic semantic alternation. This, in fact, is what accounts for the quite general property of zero verbs with the same base to fall into both the Theme and Goal classes.

(23) a. *Theme verbs:*
string the guitar
shelve the library
tape the package

b. *Goal verbs:*
string the beads
shelve the books
tape the music

As mentioned above, I suggest that the value of the [±central] feature is determined as the abstract P enters the numeration. The complement of the abstract P then acquires the thematic role associated with the value of the feature upon merger—Theme if the feature is [+central] and Goal if the feature is [–central]. On this view, the roles Theme and Goal must be considered lexically, and not configurationally, defined, since either of them may occur in the same configurational position. Note, however, that I have altered my earlier approach illustrated in example (4), Section 2 above (cf. Tyler 1998a). I am no longer suggesting that the direct object of a zero verb can have the role of Theme or Goal. I now maintain that these roles are reserved for the complement of the lower verb in a VP shell configuration, which is the base noun in the conflation structure of a transitive zero verb.

5. Thematic Hierarchy

If the roles Goal and Theme are determined by the [±central] feature of a preposition, what then is the status of the configurational approach to thematic roles? There are sound theoretical reasons for postulating some sort of configurational definition of thematic roles, especially in a Minimalist framework. It has long been recognized in the literature that thematic roles are not assigned to arguments arbitrarily. Rather, there is a great deal of cross-linguistic evidence indicating that, at the very least, thematic roles are linked to argument positions according to a certain hierarchy. The notion of a thematic hierarchy enables us to explain deviations from the canonical order as the result of syntactic movement in the computational system or as the result of the interaction of the thematic hierarchy with another systematic component of the language faculty.

Treating thematic relations in a systematic way accounts in part for Plato's Problem: How is it that speakers have such vast and detailed knowledge of their language given that their evidence is so limited? (Chomsky 1986:xxvii). For example, a thematic hierarchy can, together with other principles of grammar, account for a speaker's knowledge that what is growing in sentence (24a) is the subject, but that in (24b) it is the object:

(24) a. John is growing

b. John is growing tomatoes

Presumably, too, the thematic hierarchy in conjunction with other systematic aspects of language can tell speakers that both sentences in (25) describe a scene in which Mary did something that resulted in John receiving a book:

(25) a. Mary gave a book to John

b. Mary gave John a book

Furthermore, if a thematic hierarchy is involved in the knowledge speakers have about the sentences in (24) and (25), then it must also be involved in their ability to produce and correctly interpret the distinct meanings of the Theme and Goal verbs in (23). However, if the roles Theme and Goal are determined by a lexical feature of prepositions, it implies that the assignment of these roles is idiosyncratic, not predictable from a hierarchy. The question then is: what, if any, hierarchical relationship exists between these roles? In this section, I will propose a configurational definition of thematic relations in which the roles associated with configurational argument positions will be defined in broader terms than Theme and Goal, on an approach similar to the notional categories and relationships set out by Hale and Keyser (1993) and to the causal chain of event structure proposed by Croft (1991).

5.1. Affected Object: Subject of a Predicate of Change

Hale and Keyser's proposal that both Location and Locatum verbs have the same conflation structure accounts neatly for their transitivity. In essence, Hale and Keyser have proposed a conflation structure containing two subjects—the causer of an event (Agent) and the subject of a predicate of change which is the entity affected by the event (Patient). This complex event configuration explains why we interpret the sentences in (26) with the meanings given in parentheses:

(26) a. She saddled the horse
(cf. She caused something [involving a saddle] to happen to the horse)

b. He shelved the books
(cf. He caused something [involving shelves] to happen to the books)

By defining the direct objects structurally as subjects of predicates of change, Hale and Keyser account for the impossibility of the verb phrases in (27)[9] having the meanings associated with the corresponding sentences in (26):

(27) a. She horsed the saddle

b. He booked the shelf

This analysis also accounts for the difference in meaning between:

(28) a. paper the shelves

b. shelve the paper

The contrast in (28) has more to do with the structural definition of the affected object than with the interpretation of the base noun as Theme or Goal.[10] In (28a) the meaning is 'cause something [involving paper] to happen to the shelves.' The Theme verb interpretation for (28a) results from the knowledge that shelves can be affected if they are *covered* with paper. In (28b) the meaning is 'cause something [involving shelves] to happen to the paper.' The Goal verb interpretation for (28b) results from the knowledge that paper can be affected if it is *stored* on shelves. Thus, the contrasting Theme and Goal readings for the verbs in (28) result in part from extralinguistic knowledge.

Furthermore, the view outlined above that the base noun can have either a Theme or Goal role with respect to the affected object provides strict limits on how the object of the derived verb is affected. The object may be affected in one of two ways—in reference to an object in motion (Theme verbs) or in reference to a target (Goal verbs). Thus verbs derived from the same base noun may have one of two basic meanings:

(29) a. *shelve* the books

b. *shelve* the study

Both verbs in (29) have the meaning 'cause something [involving shelves] to happen to [the direct object].' As I have proposed, the base noun *shelf* can have just one of two basic

roles with reference to the direct object: it can be a Goal, as in (29a), or a Theme (29b). However, determining which relationship the base noun has to the affected object requires extralinguistic knowledge about books and shelves on one hand and about shelves and studies on the other hand. Because of this experiential knowledge, when shelves are involved in an action affecting books, we interpret the action of shelving as a Goal verb (29a), and when shelves are involved in an action affecting a study, we interpret the action as a Theme verb (29b).

The crucial point here is that the meaning of the derived verb as either a Goal verb or a Theme verb must be determined post-syntactically. That is, in order for the meaning of the derived verb to be interpreted, it must be in collocation with a direct object. In short, the syntactic structure determines which participant in an event is affected by the action, and the featural opposition associated with the category preposition, being part of universal grammar, limits the interpretation of zero verbs to just two basic classes of meaning. However, since the preposition in both cases is phonologically null, there must be something else at work in order for speakers to determine which class a zero verb belongs to and to interpret the verb correctly. I suggest that this results from the interaction between structural knowledge, provided by the computational system, and lexical knowledge, provided by experience.

5.2. A Generalized Configurational Approach to Thematic Roles

The structural knowledge speakers have that enables them to produce and interpret zero verbs correctly is what has been described here as the configurational approach to thematic roles. However, as mentioned, I suggest that the specific relations referred to as Theme and Goal are not defined configurationally. Instead, I propose that the configurational thematic roles have more general definitions, namely Agent, Patient, and Reference Object. The configurational positions for these three roles in a VP shell structure would be as follows:

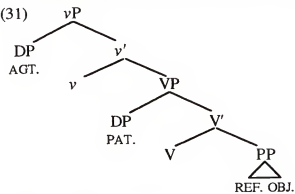
(30) *Agent*: specifier of the causative light verb (v)

Patient: specifier of the complement of v

Reference Object: complement of the complement of v

This is essentially the same as Baker's UTAH (1996a, b; see Section 3.3 above), substituting Patient for Baker's "Theme" and Reference Object for Baker's "Goal" or "Path."[11] These three positions in the zero verb conflation structure are shown below:

(31)



This configurational definition of Agent (or Causer) matches that of Chomsky, Baker, and Hale and Keyser, as discussed in Section 3 above. The configurational definition of Patient is what Hale and Keyser refer to as the subject of a predicate of change, and what Baker refers to as Theme. In other words, the Patient is the participant affected by the action named by the verb. The term "Reference Object" is borrowed from Jackendoff, who considers Reference Object a distinct role from Goal and Theme (1990b:260). However, I define the role of Reference Object more generally as the event participant with reference to which the Patient is affected. For example, Jackendoff refers to *a linguist* in (32) as an "identificational reference object" (1990:260):

(32) MIT made Peter a linguist

Zero verbs in Clark and Clark's figurative Goal category (e. g., *orphan* the children, *coil* the rope, *powder* the aspirin) are all formed from base nouns with this "identificational" reference relationship to the affected object. Thus, I have interpreted identificational reference objects as having a Goal role (see Section 2 above).

With this generalized configurational approach to thematic roles, I distinguish between the *configurational* roles in (31)—Agent (or causer), Patient (or affected object), and Reference Object—and the *lexical* roles—Theme and Goal.[12] I propose that arguments with the configurational role of Reference Object can be described as having either a central or terminal relationship in reference to the affected participant in an event (i. e., the Patient). A Reference Object with a terminal ([–central]) relationship to the affected participant in an event is essentially a Goal argument, which may be defined identificationally or spatially:

(33) turn the junk into art
grind the rocks into sand
place the objects in rows
lay napkins on the table
send the package to the customer

A reference object with a central relationship to the affected participant in an event may be considered basically a Theme argument (i. e., an object in motion) distinguishable from the participant affected (i. e., Patient). For example in (34), the direct objects are affected in reference to objects in motion:

(34) cover your face with lotion
fill the pitcher with juice
hit your wrist with a ruler
provide the children with entertainment
deprive the children of entertainment

As these examples show, the Patient (or affected object) is not always a Theme (or object in motion). In short, as defined here, the configurational role of Reference Object subsumes the lexical roles of Theme and Goal. Accordingly, a Reference Object may be a Goal or a Theme depending on whether the theta-marking preposition has a [–central] feature or a [+central] feature.

5.3. Alternating Triadic Zero Verbs

The notion that there are two lexical thematic values for the configurational role of Reference Object implies the possibility that a verb phrase could contain two Reference Objects, one with the positive value and one with the negative value of the [±central]

feature. Before examining this possibility, I return briefly to the question of the dative/double object alternation. I propose that triadic verbs which undergo the alternation select a [–central] PP complement, assigning the lexical role Goal to the Reference Object position. The preposition may be overt (e. g., *to, for*) as in the dative constructions, or phonologically null as in the double object constructions. I assume that in the double object construction, the DP complement of the phonologically null preposition is forced to raise for case purposes, accounting for the quantifier scope relations noted in Section 3.2 above.

(35) *Dative*: give a book *to* John

Double Object: give John$_i$ a book Ø $\mathbf{t}_i$

This is essentially the proposal of Baker (1996a) except that I suggest there is a PP in both constructions, whereas Baker proposes a PP in the dative construction only. With the approach that I propose, the dative construction corresponds to the canonical causal chain ordering described by Croft, and the double object construction is syntactically derived from it as a result of feature checking. In other words, the double object construction does not result from a semantic difference in the choice of preposition, in my view and in contrast to the view of Hale and Keyser (1997).

Since the negative (unmarked) value of the feature [±central] assigns the lexical role Goal to the Reference Object, I assume that Goal is the canonical or default role of the Reference Object in a VP shell configuration. This implies that if there were an argument structure containing *two* Reference Objects, the unmarked feature should occur before the marked feature. In other words, if both Goal and Theme roles were to occur in the same argument structure, then Goal should have prominence over Theme. This appears to be the case with a small class of triadic zero verbs which undergo the dative/double object alternation. For lack of a better term, I will call them Instrument-of-Transfer verbs:

(36) a. hand pencils to the students
hand the students pencils

b. e-mail your messages to people
e-mail people your messages

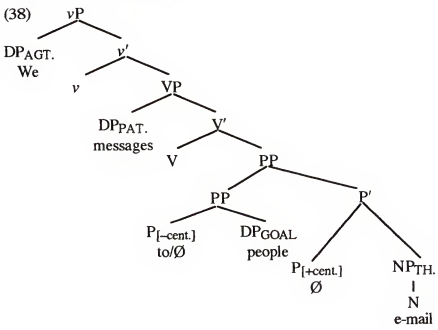
Other verbs in this category include: *guarantee, lease, will, ship, truck, ferry, mail, wire, cable, telegraph, fax, radio,* etc.[13]

As the name of the category implies, these verbs have a meaning in which the base noun represents an instrument used in transferring the direct object to a Goal. I have already suggested that Instrument verbs like *hammer the nail, anchor the ship*, etc. belong in the Theme class of zero verbs with an abstract preposition of central coincidence.[14] I have also suggested that triadic verbs like *give* which undergo the double object alternation select a preposition of terminal coincidence. Thus, I propose that triadic zero verbs in the Instrument-of-Transfer category are derived on a conflation structure containing two prepositions: one [–central] marking the Goal DP, and one [+central] marking the instrumental base noun. Compare, for example, the sentences in (37) with similar meanings:

(37) a. e-mail your messages to people

b. send your messages *to* [–central] people *by* [+central] e-mail

With two prepositional phrases, the conflation structure for a triadic Instrument-of-Transfer verb might look something like this:



On this proposed structure, the Instrument-of-Transfer verb would be derived by head-to-head movement, incorporating the base noun with the [+central] abstract preposition and then with the abstract verbs. As with other dative/double object verbs, the [–central] preposition could be overt (e. g., *to*) or phonologically null. The main difference is that in the structure for the triadic zero verb (38), the [–central] preposition is in a specifier position, meaning that even if it is abstract it will not incorporate.

To my knowledge, there are no alternating triadic zero verbs in which the order of Reference Objects is reversed, that is where the base noun is a Goal and the indirect object is a Theme:[15]

(39) a. *We people our messages by e-mail
*We people e-mail our messages
(cf. We send messages by e-mail to people)

b. ?They bank the money by wire
*They bank wire the money
(cf. They transfer the money by wire to the bank)

Even when a Goal verb takes an instrumental oblique (39b), it cannot undergo a double object alternation. This indicates that an instrumental oblique is not an argument, or at the very least that only triadic verbs with a phonologically null preposition of terminal coincidence [–central] can undergo the dative/double object alternation:

(40) a. provide money to the students [–central]
provide the students money

b. provide the students with money [+central]
*provide money the students

In short, it appears that a phonologically null preposition of terminal coincidence [–central] can take a DP or a bare NP as complement, but that a phonologically null preposition of central coincidence [+central] can only take a bare NP complement which automatically incorporates, resulting in a zero verb.

6. Thematic Roles and the Productivity of Zero Verbs

In discussing the thematic hierarchy, I pointed out that a hierarchical ordering of thematic roles helps explain Plato's Problem and accounts in part for the rapidity of language acquisition. It is reasonable to suppose as well that a thematic hierarchy is related to the productivity of zero verbs, if as I have argued, thematic roles are involved in the derivation and interpretation of zero verbs. What then is the relationship between productivity and the two thematic classes of zero verbs discussed here? The answer to this question should reflect the fact that over 70 percent of transitive zero verbs belong to the Theme class.

One answer to this question is evident in the analysis of Instrument-of-Transfer verbs discussed above. I have proposed that in a conflation structure with two Reference Objects, where both Theme and Goal roles are assigned, the Goal argument is more prominent and the Theme argument is the most deeply embedded. As a result, the Theme is the only argument in a position from which it may incorporate to form the zero verb. However, most zero verbs are formed on a conflation structure with only one Reference Object, and I have suggested that the Goal role is the canonical or default role of the Reference Object. This might indicate that the Goal class of transitive zero verbs should be more productive than the Theme class. Statistically, however, this is not the case. Of the nearly 1200 transitive zero verbs which fall into the Theme and Goal classes, 73 percent are Theme verbs (see Appendix).

I suggest that the primary reason for this lopsidedness has to do with the morphological realization and selectional properties associated with the binary feature of the category preposition.[16] As mentioned above, the [+central] and [–central] features may both be phonologically null, but only abstract prepositions with the [–central] feature, assigning the Goal role, can have either a DP complement or a bare NP complement. This means that there is more competition for a Goal argument than for a Theme argument. If the complement of an abstract preposition with the [–central] feature is not a bare NP, it

cannot incorporate to form a zero verb and must surface in a double object construction. In other words, the double object construction competes with the conflation structure of Goal verbs. No such competition exists for complements of abstract prepositions with the [+central] feature, since they apparently must be bare NPs. I suggest that it is this lack of competition which results in the greater productivity of Theme verbs, since they are verbs formed with the [+central] feature. In conclusion, the hierarchy of lexical roles giving prominence to Goal over Theme is only indirectly related to the productivity of zero verbs.

6. Summary

In this Chapter, I have outlined a proposal for assignment of thematic roles in the conflation structure of zero verbs, combining both the lexical and configurational approaches. Adapting the Uniformity of Theta Assignment Hypothesis of Baker (1996a, b), I have taken the view that the VP shell structure assigns three configurationally defined thematic roles according to the following hierarchy:

(41) *Configurational Thematic Hierarchy:*

Agent (Causer) > Patient (Affected Object) > Reference Object

Having defined the most deeply embedded argument in the VP shell as a Reference Object, I further propose that this configurational role can be specified as one of two lexical roles depending on the value of the semantic feature [±central] associated with the category preposition. This binary feature formalizes Hale and Keyser's view that the abstract preposition in the conflation structure represents a relationship of central or terminal coincidence between the Reference Object and the Patient. Drawing on the observations of Hale (1986) and Croft (1991, 1998), I maintain that the feature [±central] is a universal feature of the category preposition, assigning the Theme role if it has the positive value and assigning the Goal role if it has the negative value.

I have suggested that in a Minimalist framework the value of the feature is determined in the transition to the numeration, and because it is an interpretable semantic

feature, it does not have to be checked in the computational system. I have also suggested that the different values of the feature are implicated in different licensing features for the complement of an abstract preposition. While both values can be associated with overt or abstract prepositions, when associated with the abstract preposition, only the negative value of the feature can license either a DP or a bare NP complement. The positive value licenses only a bare NP complement when associated with an abstract preposition.

The approach to thematic role assignment presented in this chapter supports the view that zero verbs are derived syntactically according to Minimalist principles. The lexical contributions to the zero verb on this view are restricted to: (a) the base noun, (b) the abstract preposition, and (c) the abstract verb (see discussion in Chapter 6, Section 3 below). The base noun enters the computational system with the phonological and semantic features provided by its lexical entry. The abstract preposition and abstract verb enter the computational system with optional features selected in the transition to the numeration. The VP shell configuration, constructed by the computational processes of Select and Merge, determines the semantic relationship between the base noun and the other arguments in the structure according to the configurational thematic hierarchy (41). This hierarchy determines that the argument inserted in the internal subject position is the affected object, and that in the zero verb conflation structure it will be affected in reference to the base noun. Furthermore, the universal binary feature associated with the abstract preposition determines only two basic relationships that can exist between the affected object (Patient) and Reference Object. The determination of thesemantic feature as [+central] or [–central] is optional and relevant only at the output of the computational system at the interface with the conceptual-intentional system.

Notes

1. The only difficulty with eliminating the lower VP from the conflation structure of zero verbs would arise with the analysis of alternating triadic zero verbs given in Section 5.3 below, where I have utilized the VP shell along with an expanded PP.

2. I set aside discussion of Clark and Clark's Agent category, having previously proposed that it might be treated like the Instrument verbs (Tyler 1996:66).

3. The complement of V in this configuration may be a prepositional phrase as shown in (6) or an adjective phrase (see Chapter 3, Section 3.1 above).

4. This definition of Patient as affected object is sometimes used to define the role of Theme, but I define Theme more specifically as an entity undergoing motion or change toward a thematic Goal.

5. The same approach can be applied to the "spray/load" verbs which alternate with different prepositions, e. g., spray the wall *with* paint / spray paint *onto* the wall.

6. On a similar approach, we might rename the Theme class of zero verbs Instrument verbs, recognizing that Locatum verbs (e. g., *paint, saddle*, etc.) tend to have an instrumental role (see discussion in Section 2 above). Then the DP in the conflation structure (13) can be labeled Theme, following Baker's configurational approach (D. Gary Miller, p. c.) However, this approach would still present a problem in defining the possible roles of the most deeply embedded argument (Goal or Instrument) configurationally.

7. In other languages, as Hale points out, the central-terminal opposition may be associated with complementizers, or with morphosyntactic categories such as aspect and case (1986:238).

8. The category preposition is also recognized as both a lexical and a functional category. As a lexical category it assigns semantic case, and as a functional category it assigns grammatical case (see Miller 1993:60).

9. I am not suggesting that the sentences in (27) are themselves impossible; only that they are impossible with the corresponding meanings in (26).

10. The following innovative examples of zero verbs are further evidence that the thematic roles of the base noun are less significant than the structural relationships defining affectedness:

She *somethinged* her best friend (television program, *Hyperion Bay*)
This guy really *whatevers* me (television program, *Saved by the Bell*)

11. A similar approach in a different framework is presented by Dowty (1991) who uses the term "proto-roles." This designation is comparable also to Jackendoff's "action tier" (1990b) and Grimshaw's "aspectual dimension" (1990).

12. Other lexical roles could be added to this schema, e. g., Experiencer as a lexically defined type of Patient.

13. Another possible addition to this list is the innovative zero verb *beam* (as in *Beam me up, Scotty!*), assuming that as an Instrument-of-Transfer verb it would alternate like those in (36). Other possible additions to the list include the following examples from Levin (1993:46): *modem, netmail, phone, satellite, semaphore, sign* (sign language), *signal, telephone, telex*, and *wireless*.

14. It is interesting to note that many Instrument verbs can occur in benefactive constructions which may alternate (e. g., *grill a hamburger for me / grill me a hamburger, pump some gas for me / pump me some gas*).

15. There are some ostensibly triadic zero verbs which occur in the double object construction with a hyponymous cognate, e. g.:

name/nickname the baby Jo
title the poem "Rain"
tip him ten dollars
award her the grand prize

Like the alternating Instrument-of-Transfer verbs, the zero verbs in these examples are derived from nouns with a Theme role. However, with the exception of *award*, they do not alternate in dative constructions.

16. It is also possible that Theme verbs are more common than Goal verbs because of conceptual factors. Since the role Theme is defined as an object undergoing motion (Locatum or Instrument), and since the category verb prototypically represents motion, it is conceptually quite natural for nouns with the Theme role to surface as verbs.

CHAPTER 6
COGNATE PREPOSITIONAL PHRASES

1. Introduction

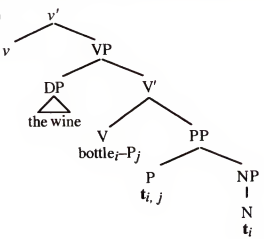
1.1. Overview

One of the key problems with a syntactic rather than lexical approach to the derivation of zero verbs has to do with the occurrence of cognate prepositional phrases in sentences such as the following:

(1) We bottle the wine *in green bottles*
Dale saddled the horse *with Roy's saddle*

Following Hale and Keyser (1993), I have proposed that the verbs in these sentences are derived from nouns in a VP shell by incorporation into abstract categories.[1] This process leaves traces in the structural positions where the incorporated noun and abstract preposition originated (2). Given this view, the problem is that the sentences in (1) cannot be formed by inserting the cognate PPs into the trace positions left by the incorporated N and P without violating the Theta Criterion (see Section 2 below).

(2)



Briefly, the problem is that the trace (t_i) left by the base noun when it incorporates to form the zero verb occupies an argument position with a thematic role in the VP shell structure. The trace must remain in this position so that the chain created by movement of the base noun can be interpreted at the interface. In other words, the trace represents the position for thematic interpretation of the base noun. Removing the trace in order to insert a cognate prepositional phrase would result in a violation of Full Interpretation and the derivation would crash (cf. Chomsky 1995:363).

In this chapter, I propose a solution to this trace problem with cognate PP constructions based on analogy with the passive *by*-phrase. The passive and cognate PPs are similar in that they are optional, and the complement NPs in these phrases are interpreted as having the same thematic role that the underlying verb would normally assign to one of its arguments. Following the standard analysis of passive *by*-phrases presented in Jaeggli (1986), I argue that the cognate PPs in sentences like (1) are adjuncts, not arguments, and that their thematic status is a result of theta role absorption. While there are crucial differences between passive *by*-phrases and cognate PPs, I will propose that the differences result from principled distinctions between passive formation and the special type of incorporation involved in zero verb formation. In short, I present a coherent syntactic analysis of cognate constructions with transitive zero verbs based on principles already available in other areas of the grammar and without relying on a lexical analysis of zero verb formation or resorting to ad hoc computational mechanisms.

1.2. Terminology

Before launching into my analysis of the cognates with denominal transitive verbs, I would like to first clarify the terminology and give some background information on cognates in general. The term "cognate object" is usually applied to noun phrases occurring in object position with intransitive verbs:

(3) Mary smiled *a charming smile*
John died *a natural death*

Hale and Keyser (1997) also use the term "cognate" in reference to noun phrases, like those highlighted in (1), occurring with transitive denominal verbs. For clarification, I will use the term "cognate object" when discussing cognates of intransitive verbs, and, following Levin (1993), I will use the term "cognate prepositional phrase" when discussing cognates of denominal transitive verbs.

To be considered a cognate, it is not necessary that a noun be a homophone of the verb it follows. A cognate may also have a historical derivational relation to the verb (e. g., *die~death*; *shelve~shelf*). The term "cognate" has also been used to identify NPs which are hyponyms of a cognate NP (Levin 1993, Hale & Keyser 1997). In other words, cognate nouns may bear a phonological, morphological, or semantic-categorical relation to the verb. Some examples follow:

(4) a. She shelved the books on the top shelf
She shelved the books on the mantle (hyponym)

b. He danced a graceful dance
He danced a graceful waltz (hyponym)

Some intransitive verbs can take objects which are not related to them in any of these ways:

(5) She walked *a mile*
She walked *the dog*
She danced *her son* around the room
He smiled *his way* into our hearts
He laughed *himself* silly

None of the italicized NPs in (5) are considered cognate objects in the literature, and though they raise interesting questions about argument structure and thematic relations, they will not be discussed here.

1.3. Cognates with Intransitive Verbs: Argument or Adjunct?

In the literature on cognate objects, one point of debate is whether the object is an argument of the verb or an adjunct. Massam (1990), for example, takes the position that cognate objects are arguments which are lexically coreferenced to the verb as result-of-action nominals. In this view, intransitive verbs which can take cognate objects are

lexically marked for this option. Additionally, Massam proposes that when an intransitive verb occurs with a cognate object, it assigns the role Patient to its coreferenced argument (1990:187).

In contrast to Massam's view that cognates are arguments of the verb, Zubizarreta takes the view that cognate objects are adjuncts headed by a modifier (1987:10; see also Jones 1988). In her view the verbs in (6a) have different lexical argument structures from the corresponding verbs in (6b).

(6) a. Mary smiled
John died
I sighed

b. Mary smiled a charming smile
John died a peaceful death
I sighed a weary sigh

According to Zubizarreta, the difference in lexical argument structure is that in (6a) the verbs select only an external argument, while in (6b) the verbs also select an internal argument which is a lexical constant, defined as an argument which is not projected into the syntax but is instead incorporated abstractly into a complex predicate at the lexical level (1987:58). Thus, Zubizarreta suggests that the cognate NPs in (6b) are adverbial adjuncts which modify the incorporated constant argument.

One criticism of the view that cognates are adjuncts is that cognate objects cannot cooccur with direct objects. In support of this criticism, Massam gives the following examples (1990:166):

(7) *Mordred killed the knight a gruesome kill
*Ethel moved her lips a slight movement

However, since the verbs in (7) cannot occur with cognate objects alone, the argument that the cognates cannot cooccur with direct objects loses force. Consequently, the sentences in (7) do not disprove the notion of cognates as adjuncts. A better example would be with the verb *shoot*:

(8) a. Mary shot John

b. Mary shot a perfect shot

c. *Mary shot John a perfect shot

d. Mary shot a perfect shot at John

e. Mary shot John an angry look

These examples lend quite a bit of support to Massam's argument that cognate objects of intransitive verbs are true objects with a Patient role. Sentence (8c) may be ungrammatical because the verb cannot assign a Patient role to two objects. By comparison in sentence (8d), the direct and indirect objects have distinct theta roles; the same is true in the double object construction (8e).[2]

Another explanation for the ungrammaticality of (8c) may be that cognate objects require adjacency in order to receive case:

(9) He shot a perfect shot every time
*He shot every time a perfect shot

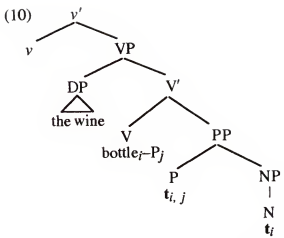
Adjacency is also required for the Goal argument to receive case in a double object construction (e. g., (8e)). Thus, (8c) may also be ungrammatical because only one NP can receive structural case under adjacency (cf. Mittwoch 1998:327).

Setting aside the questions of case and theta role assignment of cognate objects, it is interesting to note that both Massam and Zubizarreta attribute the occurrence of cognate objects with intransitive verbs to some sort of lexical selectional criteria. However, given the syntactic nature of transitive zero verbs assumed here (2), it would be inconsistent to attribute their occurrence with cognate PPs as a matter of lexical selection. Nevertheless, the question still remains to be addressed as to whether a cognate PP occurs as an argument or as an adjunct of a transitive zero verb.

2. Cognates with Transitive Verbs: The Trace Problem

In Chapter 5, I proposed that the difference between Location and Locatum verbs depends on a semantic feature of the abstract P in (2) reproduced here as (10):

(10)



I have proposed that the abstract preposition assigns a Goal or Theme role to the base noun. In addition, I assume that the lower verb (V) in the VP shell selects a PP complement. Therefore, I assume that the thematic role of the base noun is assigned compositionally by the abstract P and V in the VP shell structure. For Location verbs, the abstract V is similar to the overt verb *put* and selects a preposition of terminal coincidence with the feature [–central], assigning the role Goal to its Reference Object.

(11) a. bottle$_{GOAL}$ the wine$_{PAT.}$ ~ put the wine *in* bottles

b. shelve$_{GOAL}$ the books$_{PAT.}$ ~ put the books *on* shelves

For Locatum verbs, the abstract V is similar to the overt verb *provide* and selects a preposition of central coincidence with the feature [+central], assigning the role Theme to its Reference Object:

(12) a. saddle$_{THEME}$ the horse$_{PAT.}$ ~ provide the horse *with* a saddle

b. paint$_{THEME}$ the house$_{PAT.}$ ~ provide the house *with* (a coat of) paint

On this view, it is the abstract P selected by V which determines the class of the zero verb, regardless of the base noun that is incorporated. Furthermore, when a cognate PP occurs, its head is invariably an overt preposition corresponding to the [±central] feature of the abstract P:

(13) a. bottle the wine *in* green bottles [–central]
*bottle the wine with green bottles

b. shelve the books *on* the top shelf [–central]
*shelve the books with the top shelf

c. saddle the horse *with* Roy's saddle [+central]
*saddle the horse into Roy's saddle

d. shelve the library *with* pine shelves [+central]
*shelve the library on pine shelves

Thus, the cognate PPs contain not only a cognate noun but also a preposition that is an overt cognate of the abstract preposition incorporated in the formation of the verb. The noun in the cognate PP has the same thematic role that is assigned to the base noun involved in incorporation. In short, the cognate PPs provide concrete evidence that thematic roles are crucially involved in the derivation of zero verbs.[3]

Because thematic roles are assigned within the configuration (10), the occurrence of cognate PPs poses a problem with the Theta Criterion:

(14) *Theta Criterion:*
Each argument bears one and only one θ-role, and each θ-role is assigned to one and only one argument. (Chomsky 1981:36)

Since the base noun in (10) is an argument of the abstract V, it is assigned a unique theta role which, given the Theta Criterion, cannot then be assigned to another argument. For this reason, the base position of the noun is occupied by a trace after incorporation, blocking insertion of another noun in that position. As a result, it is impossible to form the sentences in (1) by inserting the cognate PPs into the trace positions in (10) without violating the Theta Criterion.

Before proceeding to discuss the solution to the trace problem with cognate PPs, it is important to note that the Theta Criterion as formulated in (14) is a pre-Minimalist principle. In *The Minimalist Program*, Chomsky dispenses with it as an input condition on deep structure. Nevertheless, as I understand it, the condition remains in Chomsky's Minimalism as part of the requirements of Full Interpretation, that is as an output condition (see e. g., 1995:315). More recent approaches to theta roles within the Minimalist program have proposed dispensing with the Theta Criterion entirely (e. g., Hornstein 1999).

Under the assumption of the Theta Criterion, the obvious solution to the trace problem described above is to insert the cognate PPs into a different position, making them adjuncts, not arguments. The difficulty with this solution, however, is to explain how the nouns in the adjunct cognate PPs have the same thematic role as the base nouns involved in incorporation if they are not inserted in the same theta position. In the remainder of this chapter, I am going to outline an approach to this trace problem similar to the standard analysis of passive *by*-phrases presented in Jaeggli (1986). Passive *by*-phrases pose a problem like that of the cognate PPs because they are adjunct phrases containing an NP with the same thematic role that the underlying active verb would normally assign to one of its arguments. Jaeggli suggests that the external theta role is absorbed by the passive verb and transmitted to an adjunct of VP, i. e., to the *by*-phrase. In a similar vein, I will suggest that the special process of incorporation by which zero verbs are derived is essentially a type of theta role absorption (see Section 4.2 below).

3. Semantic Analyses

3.1. Cognate Prepositional Phrases as Modifiers

The solution to be proposed for the trace problem with cognate PPs is based on the observation that the cognate phrase functions as a modifier within the verb phrase. This is similar to the view of cognate NPs taken by Zubizaretta that cognates are adjunct modifiers (1987:10; see Section 1.3 above). More precisely, the cognate PP carries new information which modifies or adds specificity to the base noun. The new information may be in the form of an adjective (15a), a specifier (15b), or a hyponym (15c):

(15) a. bottle the wine in *green* bottles
#bottle the wine in bottles
bottle the wine

b. saddle the horse with *Roy's* saddle
#saddle the horse with a saddle
saddle the horse

c. shelve the books on *the windowsill*
#shelve the books on a shelf
shelve the books

The sentences marked # in (15) are not ungrammatical, but they are redundant because they lack any new information. They contain the same information as the zero verb phrase without a cognate.

Furthermore, we can see that the cognate PPs reflect the thematic structure of the incorporated PP in (10).

(16) a. *We bottled *green bottles with* the wine

b. *She saddled *Roy's saddle on* the horse

The ungrammaticality of (16a, b) supports Hale and Keyser's view (1993) that the underlying structure of the verbs *bottle* and *saddle* must be as in (10), repeated in (17a), and not the structure shown in (17b):

(17) a. $[_{v'}$ bottle $[_{VP}$ DP $[_{V'}$ t $[_{PP}$ t t]]]]
$[_{v'}$ saddle $[_{VP}$ DP $[_{V'}$ t $[_{PP}$ t t]]]]

b. *$[_{v'}$ bottle $[_{VP}$ t $[_{V'}$ t $[_{PP}$ t DP]]]]
*$[_{v'}$ saddle $[_{VP}$ t $[_{V'}$ t $[_{PP}$ t DP]]]]

In short, I have argued that the cognate PP contains all the semantic information of the base noun and the abstract P that are incorporated in forming the transitive zero verb. In addition, the cognate PP contains new information that modifies the incorporated noun. The derived verb *shelve*, for example, contains two elements of meaning:

(18) a. an entity 'shelf'

b. a preposition of terminal coincidence

When the verb *shelve* occurs with a cognate PP such as *on the top shelf* or *on the windowsill*, the cognate PP contains all the information in (18) plus new information which modifies or adds semantic specificity to the information in (18).

3.2. Semantic (Under)Specification of Incorporated Noun

Notwithstanding the foregoing analysis, there remains a problem with (18a): How specific is the semantic information carried by the incorporated noun? This question is raised by the occurrence of hyponyms in the cognate PP.[4] A hyponym may be a member of a category named by the incorporated noun (*shelve the records on a bookshelf*), and in some cases it names a substance the noun is made of (*fence the pasture with barbed wire*). More typically a hyponym names a substitute for the incorporated noun:

(19) shelve the books on a windowsill
hammer the nail with a shoe
butter the bread with margarine
box the items in a crate

A cognate PP may also contain a noun phrase which is unrelated to the base noun in any of these ways, but if it bears the same thematic role as the incorporated noun, it fits the definition of cognate outlined above:

(20) paint your finger with iodine
hammer the table with your fist
land the hydroplane on water

While many zero verbs can occur with hyponymous cognates like those in (19) and (20), there are many others that cannot:

(21) #pocket your change in a pouch
#oil the hinge with graphite
#bottle the wine in a Mason jar
#saddle the horse with a child safety seat

While the sentences in (21) are not ungrammatical, they do not tend to occur in natural language (as indicated by #).

It seems that the nouns which incorporate to form the verbs in (19) and (20) are underspecified in varying degrees. For example the verb *to hammer* can mean 'to pound something with a hammering motion,' but it does not necessarily require the use of a hammer or a type of hammer. The verb *to butter*, however, has a somewhat more specific meaning: 'to apply butter or a butter substitute to food,' so it is not possible to **butter the*

bread with mayonnaise / with peanut butter. The nouns which incorporate to form the verbs in (21), on the other hand, are even more specific. Unlike the verb *to butter*, for example, they cannot take "substitution" cognates. While we might, for example, substitute graphite for oil in some event of lubricating, *graphite* does not occur as a cognate with the verb *to oil*.

Examples like these have been cited to argue against a syntactic derivation of all zero verbs because of the apparently idiosyncratic degrees of semantic underspecification (e. g., Jackendoff 1990b:164). It has also been argued that only the zero verbs like those in (21) are derived by the syntactic process of incorporation. Kiparsky (1997:486) suggests that the verbs in (19) and (20) and others like them involve a "bleached" meaning of the noun, but that there is no bleaching effect in the formation of the verbs in (21) and others like them which entail quite specific use of the noun in the event named by the verb. Kiparsky also suggests that among the bleached verbs there are different degrees of relatedness to the base noun. Verbs like *to shelve* and *to butter*, for example, may involve an extended or attenuated meaning of the base noun, and so they may be considered true denominal verbs. Kiparsky notes that with some zero verbs, however, there is a possibility that the base noun does not figure at all in the event named by the verb:

(22) ditch the car in a vacant lot
brush his coat with his hand

Kiparsky calls these "pseudo-denominal verbs" and suggests that they are not derived from the nouns *ditch* and *brush*, but merely share the same roots. Consequently, according to Kiparsky, there are "separate lexical entries for noun and verb, with no synchronic noun-to-verb derivational relation between them" (1997:490).

I see two problems with this analysis. One is that certain Instrumental verbs like *hammer, paddle, anchor*, and *brush*, which Kiparsky identifies as pseudo-Instrumental verbs (1997:489), can also have a direct derivational relationship to the corresponding nouns:

(23) a. I hammered the nail with a shoe
b. I hammered the nail (with a ball-peen hammer)

(24) a. She anchored the ship with a rock
b. She anchored the ship (with a steel anchor)

(25) a. He brushed his coat with his hand
b. He brushed his coat (with a lint brush)

Under Kiparksy's analysis, then, the pseudo-denominal verbs in the (a) sentences would have separate lexical entries from the corresponding noun-to-verb pairs in the (b) sentences. Another related problem is that in some cases the bleaching effect may result from a semantic feature of the direct object even when no cognate is present:

(26) a. to nail his opponent
b. to ditch her boyfriend
c. to shelve the idea

With the human direct objects in (26a, b), the verbs *to nail* and *to ditch* are not likely to be interpreted literally as involving types of nails or ditches. Likewise with the abstract direct object in (26c), it is impossible to interpret the verb *to shelve* as involving an actual shelf or a substitute for one. It seems that the specificity of the information carried by the incorporated noun depends to a certain extent on the semantics of the other nouns occurring in syntactic collocation with the zero verb. This indicates to me that the so-called bleaching effect is a post-syntactic phenomenon, and that the distinction Kiparsky makes between true denominal verbs and pseudo-denominal verbs is not a lexical distinction, but results from extralinguistic factors of the conceptual-intentional (C-I) system. This is also what makes it possible to use and interpret zero verbs metaphorically:

(27) He brushed my cheek with a kiss
They saddled the children with responsibilities
Don't bottle your emotions inside yourself

Indeed, the phrases in (26) should also be considered metaphorical uses of the base nouns.

Nevertheless, this still leaves us with the question of how much semantic information is contained in the noun which incorporates to form zero verbs. I think this is

the same question that is raised with certain transitive verbs which may occur in intransitive constructions with an understood indefinite object. The verb *eat* is a classic example. When used without a direct object, the verb implies eating a meal or something one typically eats (Levin 1993:33).

(28) I ate (lunch/a sandwich) at noon

Transitively, however, the verb may take a non-nutritive direct object:

(29) a. The child ate an eraser

b. The acid ate a hole in my shirt

c. I ate my words

None of the events described in (29) can be expressed in an intransitive construction with the verb *eat*. Without a direct object, *eat* has a more specific meaning than when it occurs with the atypical direct objects in (29). This indicates that the direct objects in (29) have a bleaching effect on the meaning of the verb. This pattern often occurs with verbs used metaphorically or idiomatically as in (26) and (27), and below:

(30) a. to knit (a sweater)
to knit your eyebrows

b. to fish (for trout)
to fish for a complement

Some argue that the verb *eat* and others like it have two lexical entries, one transitive and one intransitive, with a more highly specified entry for the semantics of the verb that occurs in intransitive constructions (cf. Zubizarreta 1987:10). I would argue, however, that because the verb that occurs without a direct object still has a transitive meaning, it has the same lexical entry and the same inherent argument structure as the verb that occurs with a direct object (cf. Larson 1988:358, fn.24). The difference occurs because the internal argument may be expressed or implied. When the internal argument is implied, the verb has a default meaning. The default meaning of the verb *eat* is 'to eat food,' and *knit* means 'to knit clothing' unless otherwise specified in the syntactic context.

In the same way, I suggest that the information carried by the incorporated noun in a zero verb is a default meaning. In general a zero verb, without a specified cognate, is interpreted as an event involving the prototypical use of the entity named by the noun which incorporates to form the verb (cf. Kiparsky 1997:482). Such an interpretation can be suspended, or metaphorically readjusted, at the C-I interface if and only if there is additional contextual information to force a different interpretation. This approach affords a more streamlined economical view of the lexicon while maintaining a syntactic process of denominal verb formation that is consistent across types. Thus, all the zero verbs in (19), (20), and (21), as well as the metaphorical examples in (26) and (27), can be derived on the structure illustrated in (10) without recourse to dual or multiple lexical entries.

3.3. The "Adverbial Increment" Hypothesis

To summarize the discussion so far, I have proposed that zero verbs contain two elements of meaning represented by the incorporated PP:

(31) a. the prototypical default meaning of the entity named by the noun

b. the relationship of terminal or central coincidence associated with the abstract preposition

Once these elements have been incorporated to form a zero verb, they leave traces in the syntactic structure. The traces not only prevent a cognate PP from filling the positions they occupy, but because the traces represent interpretable features, they are not deletable (Chomsky 1995:280).

This proposal conflicts with the view of cognate PPs set out by Hale and Keyser (1997). There they suggest that the derived verbs, using *shelve* as an example, contain two elements of meaning: (a) a referential component (generic *shelf*, for example, which may include shelf-like locations such as a desk), and (b) an "adverbial increment" (e. g., *in a shelving manner*). This dual aspect of the meaning of these denominal verbs provides Hale and Keyser with an explanation for the interpretability of a sentence like

(32) They shelved the sand

According to Hale and Keyser, it is the adverbial increment associated with the verb *shelve* which places the semantic restriction on its direct object to be in some manner shelvable. In other words, (32) does not mean simply 'they put the sand on a shelf (or shelf-like location);' more precisely it means 'they put the sand on a shelf (or shelf-like location) in a shelving manner' (1997:42).

Hale and Keyser (1997) use this dual aspect of meaning to account for the cognate PPs discussed above. Their solution to the trace problem is to associate the referential component of the derived verb with the index on the trace of the incorporated noun. This index may be optionally deleted, leaving the derived verb with no referential component; only the adverbial increment of meaning remains. As Hale and Keyser point out, deletion of the index on the trace means that "the syntactic heads involved in the original Head Movement chain . . . no longer represent a chain, since the traces are effectively gone due to index-deletion" (1997:43). Once this option is taken, according to Hale and Keyser, the position originally occupied by the base noun is open for insertion (or merging) of a DP. The difficulty with this analysis, as Hale and Keyser themselves note (1997:42, fn. 10), is that without the chain formed by incorporation, it is impossible to account for the ungrammaticality of the sentences in (16), repeated here:

(33) a. *We bottled green bottles with the wine

b. *She saddled Roy's saddle on the horse

Another difficulty is that this analysis does not account for the trace of P. Hale and Keyser are inconsistent in their analysis of the content of this abstract head. On one hand they declare that the abstract heads in (10) are "inherently bereft of properties" other than category label (N, V, A, P) (1997:34, fn. 3). On this view, there is no "trace problem" to solve for the trace of P because (a) it is not in an argument position (and thus does not technically violate the Theta Criterion if filled), and (b) it has no content to be recovered at LF (thus, the trace of movement can be eliminated without consequences). On the other hand, however, Hale and Keyser clearly recognize some semantic content associated with

the abstract P, for they attribute the distinction between Location and Locatum verbs (*bottle* and *saddle*, respectively) to the characteristic of the category P that it distinguishes between relations of terminal coincidence and central coincidence (1997:36). This distinction is reflected in the cognate PPs illustrated in (1) and (33): Locatum verbs have cognate PPs headed by *with* (never by *in/on*), while Location verbs have cognate PPs headed by *in/on* (never by *with*).[5] Furthermore, they cannot be headed by a dummy (semantically empty) preposition inserted solely for case assignment purposes:

(34) a. *We bottled the wine of green bottles

b. *She saddled the horse of Roy's saddle

I conclude, therefore, that there are (at least) two abstract Ps which may occur in structures like (10), and that the difference between them is reflected in different meanings (Location v. Locatum) of the derived verbs as well as in different heads of cognate PPs (*in/on* v. *with*). As for Instrumental verbs like *to hammer*, I have suggested in the previous chapter that they are like Locatum verbs since the incorporated noun has the role Theme, implying that they contain the abstract preposition of central coincidence (cf. Tyler 1996, 1998).

In short, like Hale and Keyser, I consider the meaning of the derived verbs to have two elements of meaning. However, I maintain that the two elements of meaning come from the abstract P and the base noun which are incorporated and that it is unnecessary to postulate an adverbial increment as part of the meaning of the derived verb. In fact, the test sentence given by Hale and Keyser (repeated as (35a) below) can be interpreted without the incremental adverbial meaning they attribute to the verb *shelve*:

(35) a. He shelved the sand

b. He shelved the sand without packaging it first, so it got all over the place

c. He tried unsuccessfully to shelve the sand

d. He shelved the books

I would argue that an act of "shelving" is expressed in (35b), even though it is an unsuccessful act. The same is true in (35c). In other words, the verb *shelve* has the same

elements of meaning in each of the sentences of (35). I maintain that what Hale and Keyser refer to as the adverbial increment in these sentences is part of the encyclopedic knowledge which is necessary for interpreting every sentence of a language and does not affect the operations of the computational system (cf. Hale & Keyser 1992:118-119).

There is another aspect of meaning in zero derived verbs that might be considered an adverbial increment; that is the sense, for example, that when one "saddles a horse," the saddle must be put on the horse in a certain manner, not haphazardly. The same is true in *shelve the books* or *bottle the wine* (the wine may not be considered "bottled" if the bottles are partially filled or uncorked). While these aspects of meaning are in large part encyclopedic, they are in an important way different from the extralinguistic aspects of meaning discussed in the previous paragraph. I would describe this main difference in terms of affectedness. In short, the difference between the zero verbs and the corresponding *put*-locutions below is that with the zero verbs the direct object is always interpreted as an affected object (Patient), whereas in the *put*-locutions the direct object may not be interpreted as affected, but merely as moved (Theme). This distinction is most obvious with the Locatum verbs in (36b) and (37b):

(36) a. bottle the wine ~ put the wine in bottles
b. saddle the horse ~ put a saddle on the horse

(37) a. shelve the paper ~ put the paper on the shelf
b. paper the shelf ~ put the paper on the shelf

I have discussed the affectedness of direct objects Chapter 5, Section 5, where I suggest that it is a particular structural property of zero verbs and not due to lexical properties such as an adverbial increment.[6]

4. The *By*-Phrase Analogy

4.1. Theta Role Absorption and Transmission to Adjunct

I have argued that Hale and Keyser's solution of the trace problem is difficult to support. Instead, I propose a solution in which the chain formed by incorporation remains,

and the cognate PP is not inserted in the trace positions, but in an adjunct position under VP. My solution is based on an observation that certain aspects of the cognate PP are similar to those of the passive *by*-phrase. Both of these types of PPs are optional in syntax, indicating that they are adjuncts, not arguments. It is also worth noting that both the passive *by*-phrase and the cognate PP serve a discourse function of focusing new information, a typical function of adjunct phrases.[7] Nevertheless, in both cases the adjunct is thematically bound because the NP in the adjunct phrase has a thematic role identical to one the underlying verb assigns to an argument position (see Miller 1993:163). This is the situation to be accounted for here: How does an NP in an adjunct phrase receive the theta role of an argument?

In the case of the passive *by*-phrase, a standard account is provided by Jaeggli (1986; see also Roberts 1987). He proposes that the passive morpheme absorbs the theta role that the underlying transitive verb would normally assign to its external argument. Theta absorption means that the theta role is available for interpretation even if there is no NP bearing the theta role, as shown in the following passive sentences without an expressed agent:

(38) a. The books were sold to raise money

b. The books were left behind deliberately

In (38a) the absorbed theta role controls PRO. In (38b) the volitional adverb presupposes an Agent. In passive sentences where the external theta role is expressed in a *by*-phrase, the NP in the *by*-phrase is always interpreted as bearing the external theta role of the underlying verb, whatever it happens to be:

(39) The books were read by the students (Agent)
The books were enjoyed by everyone (Experiencer)

Jaeggli proposes that this results from transmission of the external theta role from the passive morpheme to the prepositional phrase headed by *by*. The preposition *by* assigns the transmitted theta role directly to its complement NP. In this way, the NP in the adjunct

by-phrase receives the same theta role that the underlying verb would normally assign to its external argument.

It is my contention that a similar process of theta role absorption and transmission occurs with zero verbs. The theta role that is assigned to the incorporated noun (Theme or Goal) is interpretable even if there is no cognate PP. In fact, it is possible to interpret a hidden cognate noun in a cognate PP which contains a modifier alone if that modifier can occur as a nominal (40a):

(40) a. He shelved the books on the top

b. He shelved the books on the top shelf

c. He shelved the books on the top floor

Without additional contextual cues, sentence (40a) can only be interpreted as meaning (40b) and not (40c), for example. One difference between (40a,b) and (40c) is that the PP in (40c) is not a cognate. This may depend on the level of PP adjunction (see Section 4.3 below).

4.2. Conflation Is Theta Role Absorption

The main difference between theta role absorption with the passive and with zero verbs is that the noun which incorporates to form a zero verb leaves a trace in the theta position. In passive formation, on the other hand, there is no trace of the external argument. Zubizarreta suggests that the interpretability of the Agent role without a trace contributes to the fact that agentless passives can be interpreted universally (1987:56):

(41) The answer can be found on page 50
(cf. Everyone can find the answer on page 50)

With zero verbs, however, the trace of the noun prevents a universal interpretation:

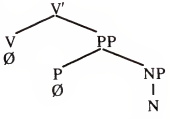
(42) shelve the books
(*put the books on every shelf)

The trace left by the incorporated noun in the derivation of (42) forces a default interpretation of the base noun. Traces result from movement and are recoverable at LF.

In the absence of a trace, theta role absorption is all there is to account for the interpretability of the external theta role in passive sentences like (38), (39), and (41). However, in the case of zero verbs, it is in a certain sense redundant to suggest that a theta role assigned to a trace position is absorbed. Since the trace represents the position of interpretation for the theta role of the moved element, theta absorption for purposes of interpretation is superfluous. Nevertheless, there must be some process akin to theta absorption with zero verbs to account for the occurrence of an NP with an identical thematic role in the cognate PP.

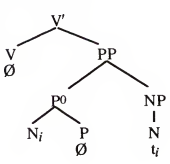
In the case of zero verb formation, the process of incorporation involves movement of N from a theta position to a non-theta position. This means, crucially, that the chain formed by incorporation is not an argument chain as is formed by NP-movement. But neither is it an A′-chain as is formed by WH-movement. One reason for these differences is that incorporation involves movement of heads, not of phrases, and head movement is strictly local. The head-to-head movement involved in zero verb formation occurs in stages of successive cyclic movement as illustrated in (43), (44), and (45) below (cf. Hale & Keyser 1993:58). The structure in (43) is basic as results from the operation Merge:

(43)



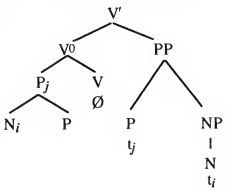
The first step of incorporation (44) involves movement of N to P, forming an X^0 terminal [N_i, P] and leaving a trace (t_i).

(44)



The second step of incorporation (45) involves movement of P to V, forming the complex X^0 element [[N_i, P] V] and leaving another trace (t_j).[8]

(45)



The locality constraint on head-to-head movement means that the N which receives a theta role in its base position moves to the abstract P and V which compositionally assigned the theta role. I see this movement of N from a theta-*receiving* position to a theta-*assigning* position as a direct and immediate instance of theta absorption. In other words, noun incorporation is, by definition, theta role absorption. In the passive formation as described by Jaeggli, theta role absorption occurs through the passive morpheme on the verb. In zero verb formation, however, there is no overt morphological mediator, and theta role absorption is an inevitable consequence of the special type of incorporation that occurs in the formation of zero verbs.

Hale and Keyser (1998) refer to this special type of incorporation as "conflation." It occurs when an overt bare lexical item raises to an abstract lexical head position in the category immediately dominating it. As has already been pointed out, this process is constrained by the operation of head-to-head movement under the Empty Category Principle. In principle, conflation should occur whenever the bare head of a lexical category is immediately dominated by an abstract lexical category. In other words, conflation is automatic and immediate (cf. Hale & Keyser 1998:86). Furthermore, conflation involves left adjunction, which means that the rightmost member (the morphological head) of a conflated item will be the phonologically null abstract target of

movement. Crucially, this definition of conflation involves movement to lexical nodes in the computational system.

In contrast, feature checking involves movement to functional nodes in the syntax. Harley and Noyer (1998) distinguish between functional and lexical nodes in the following way.[9] Functional nodes are occupied by vocabulary items (VIs) which consist of feature bundles determined by the grammar of a language, while the VIs inserted at lexical nodes are free choices of the speaker and have truth-conditional force.

> For example in (0), the VIs *the*, *-ed*, and *a* are completely determined by the grammar for the speaker, given a syntactic structure containing appropriate f-nodes with such features as [definite], [past] and [indefinite]. The choice of the VIs *cat* and *mouse* are not so constrained; the speaker might equally have chosen *shark* and *fish*.
> (0) a. The cat chased a mouse.
> b. The shark chased a fish. (Harley & Noyer 1998:120)

Thus, in a passive construction the vocabulary item associated with theta role absorption is a functional morpheme (*-en*) determined by the grammar of English, given features such as [stative] and/or [passive].[10] However, the choice of base noun in a zero verb construction is completely open, depending on the propositional content being expresssed, for example:

> (46) The Gallo brothers bottle their wine
> The Franzia brothers box their wine

This distinction between lexical and functional nodes implies that the process of conflation in zero verb formation is not a result of feature checking as occurs with passive formation and other types of syntactic movement, but is instead an immediate consequence of the structure containing abstract heads and resulting from the operation Merge (43). In essence, then, the theta role absorption that occurs with zero verb formation is also an immediate consequence of the structure illustrated in (43).

One distinctive aspect of zero verb formation is the incorporation of the abstract P. I have already suggested that this abstract P has an interpretable feature (i. e., [±central]). Once this feature raises to V, as illustrated in (45), it is in a position to be transmitted to a cognate PP by a process of feature percolation. The percolated feature would then

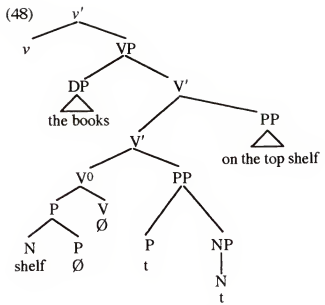
determine which overt preposition heads the cognate PP. Like the passive *by*-phrase, the cognate PP must be headed by an overt preposition in order for the absorbed theta role to be transmitted to a noun phrase. In this scenario, I would assume that the overt head of the cognate PP is inserted at spellout (late insertion) so that an appropriate overt preposition of terminal or central coincidence surfaces.

4.3. The Level of Adjunction of the Cognate PP

Another distinction between the passive *by*-phrase and the cognate PP is the level at which the adjunct prepositional phrase is adjoined. A passive *by*-phrase is adjoined at the phrasal (XP) level. Larson points out that this is a result of a constraint on theta assignment (1988:352):[11]

(47) If α is a θ-role assigned by X^i, then α may be assigned (up to optionality) to an adjunct of X^i.

Since the external theta role of a transitive verb is assigned compositionally by *v*P, then according to (47), the absorbed theta role of the passive may be optionally assigned (or transmitted, in Jaeggli's terms) to an adjunct of *v*P. Applied to the zero verb conflation structure, this constraint means that a cognate PP will be adjoined at the V′ level because the N which incorporates to form the zero verb receives its theta role compositionally from the abstract V and P heads in (43). In other words, the theta role is assigned by V′, which consists of V and PP. The diagram below illustrates the structure of a zero verb with cognate PP after conflation, using the sentence in (40b):



It should be noted that the structure under V^0 raises to *v* in the final stage of incorporation, forming the transitive verb *shelve* with its direct object DP *the books*.

The configuration in (48) illustrates the scope of modification of the cognate PP—it has scope over the traces of N, but it does not have scope over *v* (the final landing site of N) nor over the direct object. As a result, information contained in the cognate PP adds semantic specificity to the incorporated noun, not to the derived verb or verb phrase. The scope relationship between the cognate PP and the traces also suggests that the modifier element is the semantic, if not the structural, head of the cognate PP (cf. Zubizarreta 1987).

Other adverbial adjuncts must be adjoined at the level of VP or higher in order to have scope over the direct object and/or the derived verb, as in (49b):

(49) a. He shelved the books on the third shelf (adjunction at V')
b. He shelved the books on the third floor (adjunction at VP)

The prepositional phrase in (49b) tells where the shelving event took place; in (49a) it merely tells something about the shelf.[12] Because the two PPs are adjoined at different levels, they can cooccur, but with scope restrictions:

(50) On the third floor, he shelved the books on the third shelf
*On the third shelf, he shelved the books on the third floor

5. Summary and Conclusion

The purpose of this chapter has been to explain the thematic and structural relationships arising when zero verbs occur with cognate PPs. I have assumed that zero verbs are formed by incorporation of a noun which receives a theta role in its base position. Thus, the base noun is an internal argument of the abstract verb with which it incorporates, and it is therefore subject to the Theta Criterion. Because the process of incorporation leaves a trace in the theta position of the base noun, it is theoretically impossible to insert another argument in the same position. The problem was to explain how the noun in a cognate PP could receive the same theta role that is assigned to the base noun in the conflation structure of a zero verb.

I have outlined a two-pronged solution to this problem. First, I suggest that the cognate PP is an adjunct rather than an argument since it is optional and functions as a type of modifier phrase. I then propose that the special process of incorporation involved in zero verb formation is an immediate and inevitable process of theta role absorption. In short, when the base noun conflates with the abstract lexical heads in the zero verb structure, the resulting verb automatically absorbs the theta role assigned to the noun. This process of theta role absorption, together with a constraint on theta role assignment, provides a means for the absorbed theta role to be transmitted to an adjunct phrase. I have also proposed that the position of adjunction of the cognate PP is at the V′ level, accounting for the view that these cognates modify and have scope over the base noun but not the entire verb phrase.

I have also set out a hypothesis regarding the semantic content of the elements which incorporate to form zero verbs. I follow Hale and Keyser in suggesting that the abstract preposition designates a relationship of central or terminal coincidence, by way of a semantic feature [±central]. Furthermore, I propose that the noun which conflates with the abstract P and V has a prototypical default meaning which can be metaphorically reanalyzed

at the C-I interface if and only if there is additional information of an encyclopedic nature to force an extended or attenuated interpretation.

The solution to the problem of cognate PPs with zero verbs described here has certain advantages over other approaches. Unlike the approach outlined by Kiparsky (1997) who suggests multiple lexical entries for certain types of zero verbs, my proposal permits a syntactic view of zero verb formation that is consistent across types and significantly reduces the lexical burden. And unlike the approach outlined by Hale and Keyser (1997) who suggest a process of trace-index deletion, my proposal does not rely on any ad hoc operations of the computational system. Instead, I have borrowed two concepts from the literature on passive formation—theta role absorption (Jaeggli 1986) and a constraint on theta role assignment (Larson 1988). I have merely adapted these concepts to the process of zero verb formation, arriving at a coherent syntactic solution to the cognate PP problem based on principles already available in other areas of the grammar.

Notes

1. As noted in Chapter 5, Section 1, a conflation structure with an expanded PP and without the lower VP could be used instead of the standard VP shell without substantively altering the analysis to follow.

2. Additional evidence in support of Massam's view can be found in a comparison of cognates with *shoot*, *throw* and *pitch*:

(i) a. *Mary shot John a perfect shot
b. ?Mary threw John a perfect throw
c. Mary pitched John a perfect pitch

These three examples differ semantically in terms of the degree of contact with the Goal argument (*John*). The grammaticality improves as the degree of contact decreases. This indicates that when a Goal argument becomes an affected argument (i. e., Patient), the cognate is impossible (ia). Notice that all three sentences, including (ia), are grammatical on the reading that Mary was performing for John (i. e., John is unaffected).

3. There are some zero verbs with both Location and Locatum meanings which may not always occur with a cognate PP headed by a preposition corresponding to the appropriate abstract P. In the following examples, the cognate of the Locatum verb is invariably headed by *with*, as expected, but the cognate of the Location verb can vary:

(ii) a. *Locatum*
tape the package *with* duct tape
index the book *with* an author index
string the guitar *with* nylon strings

b. *Location*
tape the music *onto* / *with* magnetic tape
index the authors *in* / ??*with* a separate index
string the beads *on* / ??*with* a nylon string

It appears that the putative Location verbs are also interpretable on an Instrumental reading. See Clark and Clark (1979:779) for a discussion of this ambiguity.

4. I use the term "hyponym" loosely here to describe cognate nouns which have a semantic-categorical relationship to the base noun. This usage does not necessarily reflect the meaning 'a type of' usually associated with the term hyponym.

5. But see footnote 3 above regarding certain deviations from this general rule. Under the present analysis, I can offer no explanation for them.

6. Note, however, that the purported absence of affectedness suggested here for the arguments of *put* may lead to a modification of the analysis of thematic roles presented in Chapter 5, at least for a non-alternating triadic verb like *put*.

7. For a succinct discussion of the "given-new" relationship in passive constructions, see Renkema 1993:149-150.

8. Note that in (45) the incorporated heads (N_i and P_j) do not bind their traces as would be required in the Government and Binding framework (Chomsky 1981). In Minimalism, however, the government and binding relationships for lexical heads have been recast as properties of chains, making the heads under V^0 in (45) legitimate antecedents of their traces (see discussion in Chomsky 1995:176-186).

9. Harley and Noyer use the terms "*f*-node" and "*l*-node," loosely suggeting that the *l* might stand for "licensed" in their model (1998:120, fn. 1).

10. A precise morphosyntactic feature designation for passive verbs is not essential to the present discussion.

11. Larson refers to this constraint as a principle of argument demotion. It is important to note that he offers this principle to distinguish between external argument demontion in passive constructions and internal argument "demotion" in double object constructions (1988:352).

12. The structural distinction made here between an event modifier and the cognate PP modifier suggests that cognate PPs are crucially unlike the cognate nouns that occur with unergative verbs as analyzed by Mittwoch (1998). This stands to reason given Hale and Keyser's structural distinction between the conflation structures of unergative and transitive verbs (see Chapter 3, Section 5.1 above).

CHAPTER 7
CONCLUSION: FURTHER ISSUES

The approach to zero verb formation taken in this study is based on a view of Minimalism in which there is no interface between the lexicon and the computational system and there are no computational operations in the lexicon. On this approach, transitive zero verbs are not listed or formed in the lexicon. Instead, they are derived in the computational system and interpreted at the output by the conceptual-intentional system. This approach accounts for the fact that the meanings of transitive zero verbs are determined in collocation with direct objects, as the following examples demonstrate.

(1) a. string the guitar
string the beads

b. shelve the library
shelve the books

c. tape the package
tape the music

Rather than listing the six verbs presented above, along with the three nouns from which they are derived, the lexicon contains entries for just the nouns.[1] Consequently, on the approach advocated here, the lexical burden is greatly reduced.

In explicating this non-lexicalist approach to the derivation of zero verbs, I have addressed certain problems that arise, namely the derivation of triadic ditransitive zero verbs and the occurrence of cognate prepositional phrases. However, numerous additional issues and problems remain for future analysis. In this chapter, I will outline some of the directions that might be taken for future research in this area.

1. Lexical Entries and Morphological Structure

The non-lexicalist approach to zero verb formation raises the obvious question of the derivation of zero verbs that have idiosyncratic meanings. Many zero verbs have arbitrary elements of meaning that suggest they are listed as lexical items distinct from their base nouns:

(2) to card someone ('ask someone for identification, proof of age')
to knife someone ('wound someone with a knife')
to proposition someone ('make sexual advances')
to buttonhole someone ('detain someone for a private discussion')
to railroad someone ('to unfairly assign guilt')

In some cases, the lexicalized meaning of the verb blocks a generic meaning; so, for example, the verb *to knife* is not used as a simple Instrumental verb as in *to knife the bread*. Another example of lexicalization is evident in the contrast between *to mother* and *to father*. While you can mother someone without being a mother, only the biological father is said to have fathered someone.[2] In addition, numerous zero verbs form idiomatic expressions that must be learned as lexical units:

(3) to be bummed out
to bomb a test
to buck someone up
to rat someone out
to be able to stomach something

The zero verbs in (2) and (3) are not semantically transparent, even in collocation with a direct object, and therefore must be learned as lexical units distinct from their base nouns. While the idiomatic zero verbs may have some metaphorical or polysemous relationship to their base nouns, they are apparently not derivationally or computationally related.

Another group of zero verbs that involve lexical idiosyncrasies are those that occur in verb-particle constructions. Even when the zero derived verb has a non-idiosyncratic meaning, the choice of particle—whether aspectual (4a) or directional (4b)—often seems to be lexically fixed.

(4) a. line the items up
ball the paper up
fog the window up

b. towel the glasses off
gun someone down
to clue someone in
ice the boat in
rein the horse in
pencil the answer in
x the answer out
parcel the goods out
bail someone out

Oftentimes, the interpretation of verb-particle constructions is metaphorical:

(5) to butter someone up
to sponge (money) off someone
to squirrel something away
to wolf something down
ferret the information out

While the semantics of particles is beyond the scope of the current discussion, it is evident that the particles contribute meaning to the constructions and are not completely random.[3] It seems unnecessarily redundant to list the verb-particle constructions as independent lexical units since their meanings are very much a sum of the parts. Nevertheless, the knowledge of which verbs occur with particles is not completely predictable.

(6) stable the horses (*in) / (*up)
pen the horses *(in) / *(up)
cage the horses (in) / (up)
saddle the horses (*in) / (up)

On an optimal view of lexical entries (see Chapter 2, Section 3.1), it is not necessary to include the information in (6) in the lexicon since the choice of particle does not have any effect on the feature checking processes of the computational system. In other words, computationally there should be no difference between *stable the horses in* and *cage the horses in*. The question that remains is why the latter is acceptable but the former is not. If the distinction is not lexical, then perhaps it is determined at the output in the conceptual-intentional system; but given the examples in (6), this approach seems a flimsy

last resort. If the distinction is lexical, however, it would be difficult to argue that it is part of the lexical entry of the base noun. Consequently, the most straightforward approach to the particle constructions with zero verbs may be to list them independently in the lexicon. Of the 1200 transitive zero verbs collected for this research, barely one percent occur only in verb-particle constructions. Given these statistics, the lexical listing approach—at least for those verbs requiring a specific particle—does not seem overly burdensome.

Another remaining issue involving particle constructions with zero verbs is structural. It is clear that the particle is not necessarily an overt cognate of the abstract preposition in the conflation structure of the zero verbs. Instrumental verbs like *gun* and *towel*, for example, have an abstract preposition of central coincidence, yet they occur with the particles *down* and *off* which may signal terminal coincidence. This poses no difficulty if the verb-particle constructions are lexically listed. However, substantial research suggests that verb-particle constructions in general are derived in the syntax by merger of the particle in a VP (Den Dikken 1995; see also Baker 1997). There seems to be no theoretical reason why the same approach cannot apply to particles with zero verbs. Furthermore, a syntactic approach, possibly involving late insertion, could account for the many zero verbs which occur optionally with aspectual (7a) or directional (7b) particles.

(7) a. coil the rope up
tape the package up

b. string something up
anchor something down
hammer something out
cage the animals in

It may very well be that verb-particle constructions involve operations in all modules—phonological, syntactic, conceptual-intentional— and that the operations are not the same for all types of verb-particle constructions. Clearly, there are many aspects of the syntax and semantics of particle constructions with zero verbs remaining to be resolved.

Similar structural and semantic considerations arise in the derivation of zero verbs

from compound nouns. The question is whether the compound noun is formed by the same type of computational operation (incorporation) that forms zero verbs or whether it is listed as a lexical unit and merged into the zero verb conflation structure as a whole. If we assume that the compounds are themselves formed by computational operations, then the formation of zero verbs from them may follow straightforwardly. However, many zero verbs are formed from compounds which seem firmly lexicalized.

(8) blacklist someone
pigeonhole the request
sidetrack the conversation
badmouth someone
butterfly the shrimp
blindfold someone
dogear the pages
stonewall the investigation
white-out the error
bullshit someone

Some examples of complex zero verbs illustrate bracketing ambiguities, so that it is difficult to determine, synchronically, whether they are zero derived from complex nouns or whether they are constructed around a head that is basically a verb (9) or a head that has already undergone conversion (10).

(9) a. not something a legislator should *knee-jerk support*
(cf. *support* it in a knee-jerk manner)

b. I'm not the only one who *hero worships* him
(cf. *worship* him as a hero)

c. to *pleabargain* his way out
(cf. *bargain* for a misdemeanor plea)

d. people who have been *term limited*
(cf. *limit* people's terms)

(10) a. Do you know how to *white water raft*?
(cf. *raft* in white water)

b. a constitutional right to *home school* their children
(cf. *school* their children at home)

In short, the zero verbs derived from compounds raise the issue of how to integrate multiple word formation processes (e. g., compounding and zero derivation) into a uniform computational component.

Another morphological issue which presents complexities for the syntactic derivation of zero verbs involves prefixation. The prefixes (or proclitics) *out–*, *re–*, and *de–* often create verbs by attaching to nouns which do not occur separately as zero verbs.

(11) *(out–) fox someone
*(re–) bristle the brush
*(de–) lint the clothes

In the case of *re–* and *de–* the situation almost certainly involves the conceptual-intentional system, since there are conceptual, pragmatic reasons why we do not "bristle brushes" or "lint clothes."[4]

Another problem that arises with affixation involves negative morphemes (Tyler 1998b). Marchand points out that *de–* and *dis–* can be used with both Location and Locatum verbs to form antonyms, but they cannot be affixed to Instrument verbs (1969:134-135; see also Clark & Clark 1979:779). This suggests that the feature [±central] is not adequate to determine the licensing environment of these prefixes, since both Locatum and Instrument verbs are [+central]. It appears that another feature is needed to distinguish the licensing environment for prefixes with Locatum and Instrument verbs. Antonyms of Instrument verbs are formed with *un–*, which also affixes to many Location and Locatum verbs. Often the choice between *de–* and *un–* seems lexicalized:

(12) decipher / *uncipher
decode / ?uncode
*decoil / uncoil

Another aspect of antonym-forming prefixes for future analysis is the scope of negation. As with compounding and particle constructions, the issues raised by negative (or partitive) prefixes with zero verbs appear to be multi-modular.

2. Thematic Roles and LF Movement

One of the most difficult aspects of the analysis of zero verbs presented in this dissertation involves thematic roles. In the Minimalist program, thematic roles have an ambiguous status. Most recently, Hornstein, has offered an approach for "eliminating the last vestiges of D-Structure still extant in Chomsky's (1995) version of the Minimalist Program" (1999:69). Basically this involves dispensing with the Theta Criterion and treating theta roles as features of a lexical item. Specifically, Hornstein proposes that "a D/NP 'receives' a θ-role by checking a θ-feature of a verbal/predicative phrase that it merges with" (1999:78). Under this approach, there is no limit on the number of theta roles a chain may have. One of the difficulties with Hornstein's approach is that it still preserves the distinction between formal features and thematic roles that is explicit in Minimalism ("... there should be no interaction between θ-theory and the theory of movement" Chomsky 1995:312ff). Checking a theta feature in Hornstein's approach is different from checking a formal feature like case, since the theta feature of a D/NP is acquired as a result of merger, but the case feature is acquired before merger (in the transition to the numeration). In the Minimalist program, feature checking is described as a process of feature matching and deletion (Chomsky 1995:197), and it applies to formal features only. Hornstein's approach adds another kind of feature checking which applies to theta features (i. e., semantic rather than formal features). In Hornstein's words, "One might think of this as 'transferring' the verbal θ-feature to the nominal expression" (1999:79). In essence, I have made a similar proposal, using the semantic feature [±central] associated with the category preposition (see Chapter 5, Sections 4 and 5 above).

One advantage of the approach offered by Hornstein could be a more perspicuous analysis of cognate prepositional phrases. The analysis presented in Chapter 6 above relies on pre-Minimalist concepts of theta role absorption and percolation to account for the same theta role being assigned to different NPs in the same verb phrase. With elimination of the

Theta Criterion, it should instead be possible to account for cognate prepositional phrases (and perhaps for the passive *by*-phrase as well) using the more straightforward theta feature checking approach. In short, there is no reason why the abstract preposition in a zero verb conflation structure cannot assign the same theta feature to the base noun that an overt preposition in the cognate PP assigns to the cognate noun phrase. What remains to be explained is why they *are* both the same. An approach along the lines of Hornstein's proposal appears to have great potential for addressing such issues.

A much more radical approach, however, would be to eliminate thematic roles from the computational system altogether. On this approach, the only semantic roles relevant to the computation would be configurationally defined (see Chapter 5, Section 5.2 above; cf. Baker 1996b:226). Other thematic role distinctions between NPs occurring in the same configurational positions would be determined in the conceptual-intentional system. Semantic features such as [±central], whether intrinsic or optional, may only be relevant for licensing purposes at spellout under a late insertion approach (cf. Harley & Noyer 1998).

On a related front, another issue to be addressed in reference to the analysis of zero verbs has to do with the LF representation. Following Hale and Keyser, I have assumed that the conflation structure of transitive zero verbs is identical to the VP shell structure of triadic verbs (see Chapter 3, Section 2.2 above). However, there is a difference that should be a matter of LF representation. Notice that, in the following examples, the triadic verb form (13a) is ambiguous as to Locatum or Location reading, while the transitive zero verbs (13b, c) are not:

(13) a. put the paper on the shelf (Location or Locatum reading)

b. shelve the paper (Location reading only)

c. paper the shelf (Locatum reading only)

The difference between the Location and Locatum verbs is accounted for on the configurational approach, because the direct object is the subject of the predicate of change

in the conflation structure (see Chapter 5, Section 5.1 above). However, this configurational approach suggests that the *put*-locution (13a) should *not* be ambiguous, but should have only the Location reading associated with (13b). One possible explanation for the ambiguity of (13a) is that some LF movement is involved in the derivation of the *put*-locution that is not involved in the derivation of the zero verbs (cf. Aoun & Li 1993). Nevertheless, it is not clear that the ambiguity of (13a) is due to scope relations resulting from LF movement. Instead, it may be due to the semantics of DP:

(14) a. put *paper* on the shelves (Locatum reading, cf. 'paper the shelves')

b. put *the papers* on the shelves (Location reading, cf. 'shelve the paper')

Construal of *paper* as a mass noun (14a) or a countable noun (14b) disambiguates the *put*-locution.[5] Once again, it appears that the ability of speakers to distinguish Location and Locatum relationships involves a combination of lexical, structural, and conceptual knowledge.

3. Transitivity Alternations

Another issue arising in the analysis of zero verbs involves transitivity and transitivity alternations. Hale and Keyser have argued that denominal zero verbs formed with an abstract preposition are resolutely transitive, unlike deadjectival verbs which alternate in transitivity (1997:52ff; see discussion in Chapter 3, Section 5 above).

(15) a. We shelved the books
*the books shelved

b. We cleared the screen
The screen cleared

There are several denominal zero verbs which do, however, alternate in transitivity:

(16) a. We lodged the guests in the cottage
The guests lodged in the cottage

b. The captain docked the ship in Marseilles
The ship docked in Marseilles

c. She coiled the snake around her neck
The snake coiled around her neck

d. I sounded the alarm at midnight
The alarm sounded at midnight

Nevertheless, it appears that zero verbs which alternate between transitive and unaccusative argument structures occur only in the Goal class of zero verbs (Location verbs (16a, b) and Figurative Goal verbs (16c, d)).[6] I have found only one (putatively) Locatum verb that undergoes the transitive-unaccusative alternation:

(17) They dressed the children in rags
The children dressed in rags

However, the use of the preposition *in* [–central] in the cognate prepositional phrase of (17) indicates that *dress* would be more appropriately classed as a Location verb (cf. ?*dress the children with rags*). Furthermore, there are no verbs in the Instrument and Agent categories that undergo the transitive-unaccusative alternation. In general, then, only verbs in the Goal class, formed with an abstract preposition of terminal coincidence [–central], may alternatively occur in unaccusative structures.

Hale and Keyser have also argued that denominal unergative verbs cannot transitivize (1997:33, 1998:83):

(18) The child laughed
*The clown laughed the child (cf. 'made the child laugh')

Nevertheless, there are examples of unergative zero verbs which do occur in transitive constructions:

(19) a. The children bus to school
We bus the children to school

b. The tour group jets to Singapore
We jet the tour group to Singapore

Conceivably, all the unergative zero verbs derived from nouns meaning 'instrument of transportation' could occur in transitive constructions with an 'instrument of transfer' meaning:

(20) We'll concorde (the donor organs) to Paris
We'll ferry (the cars) across the Mersey
We'll parachute (the care packages) into Kosovo
We'll shuttle (the ticket holders) to the airport
We'll bike (the pizza) to your door
We'll elevator (the furniture) to the penthouse

On their unergative readings, these verbs tend to have a reflexive meaning (e. g. *bike (myself) to your door*; cf. *laugh myself silly*). This suggests that the basic argument structure of these Instrument verbs, though superficially unergative, is implicitly transitive.

There are also zero verbs in the Agent ([+central]) category which are basically unergative, but may alternately occur in transitive constructions. These are verbs which typically occur as unergatives in the frame 'to ____ for a living.' However, several of them can take a direct object:

(21) She waitressed the banquet
He chauffeured the princess
He jockeyed the horse
She emceed the ceremony
He quarterbacked the game
She pickpocketed your wallet
He modeled the underwear
She piloted the plane

In these cases the direct object seems to be implicit in the unergative constructions:

(22) He models (articles of clothing) for a living
She pilots (airplanes) for a living

As for the category of Locatum verbs, there are none which occur as intransitives without an aspectual particle, and these are few in number. The verbs *cloud, mist, tear, ice, frost*, and *fog* all require a particle in an unaccusative construction:

(23) The lake iced *(over)
The sky clouded *(up)
Your eyes teared *(up)
The window fogged *(up/over)

The Locatum verbs, therefore, seem to be the prototypical zero verbs which are resolutely transitive but can detransitivize with overt morphology, such as passive or particle.[7]

One interesting observation from this discussion of transitivity is that the zero verbs which occur in both unergative and transitive constructions are verbs in the Theme class (Locatum, Instrument, and Agent verbs), formed with an abstract preposition of central coincidence in their transitive form [+central]. The few verbs in this class which may occur in an unaccusative argument structure (as discussed in the previous paragraph) can only do so with overt detransitivizing morphology. In contrast, the verbs undergoing the transitive-unaccusative alternation belong to the Goal class, formed with an abstract preposition of terminal coincidence in their transitive form [–central]. One question that immediately surfaces is how the [±central] feature, which is associated with the category preposition, might figure in determining unergativity or unaccusativity of zero verbs when, according to Hale and Keyser's analysis, the conflation structures of unergative and unaccusative verbs do not contain abstract prepositions. There obviously remains a great deal of analytical research to be done to determine whether the semantic feature [±central] is indeed implicated in the argument structures of denominal verbs.

4. Parametrization

Another area for further research on zero verbs is parametrization. While zero verbs are highly productive in English, in other languages their productivity is restricted. For example, according to Babyonyshev (1999), only Locatum verbs are possible in Russian, but not Location or Instrument verbs. Again, the [±central] feature is not adequate to make this distinction. Babyonyshev suggests that the constraining factor has to do with semantic features such as stativity and manner. Although zero verb formation is common in the developmental grammar of children in various linguistic environments (see Chapter 4, Section 4), there are some languages where zero verbs are virtually absent. Chinese is one.[8] Research on various dialects of Chinese indicates that the few zero verbs which are attested are historical artifacts, rarely occurring in natural speech (Chan &Tai 1994).[9] In modern Chinese, a productive denominal formative is *–hua*, an inchoative

suffix that forms intransitive verbs. There is no productive process of transitive denominal verb formation in modern Chinese (Tai 1997). In short, the research question is: What are the parameters that constrain and/or bar zero verb formation in languages where it is not a productive process of the computational system?

5. Summary

In this chapter, I have outlined a few aspects of the syntax and semantics of zero verbs open for further research and debate. These considerations have implications for the wider context of post-Minimalist linguistic analysis.

One observation that came up repeatedly in the previous discussion was that processes which result in similar surface forms may occur in distinct and/or multiple modules of the grammar. Verb-particle constructions, which seem to involve lexical, syntactic, morphological, and conceptual factors in varying ways, are a case in point. If form alone is not a reliable determiner of process, then the research path is much more complicated and obscure. Questions of when, how, or whether the modules interact require continued in-depth discussion in the literature. In the Minimalist framework where there is no internal interface between the lexicon and the computational system, our object must be to explicate the processes of the external interfaces—morphology at the output to the articulatory-perceptual system and word interpretation at the output to the conceptual-intentional system. As the non-lexicalist approach develops within the Minimalist program, the focus of research is proving to be these very issues (see Marantz 1999).

Among the most promising avenues of approach to this endeavor seems to be the concept of semantic-thematic features, which has recently emerged as a focus of analysis and explication in both the Distributed Morphology and Minimalist frameworks (e. g. Harley & Noyer 1998, Hornstein 1999). As I have suggested above, the feature [±central] for example, appears relevant to issues of argument structure and parametrization. Additional semantic-thematic features may prove relevant to questions arising with

antonym-forming prefixes and verb-particle constructions. Abstract features, however, pose many of the same analytical problems for Universal Grammar that arose with the concept of theta roles such as computational relevance, theoretical necessity, and learnability issues. Basically, the question is whether they have explanatory, or merely descriptive, value. This will be a continuing point of debate, for as Chomsky has pointed out, it is the question that has shaped and directed the modern study of linguistics (1995:5). And, in the end, as Ortega y Gasset has said, it is essentially the question of all science:

> By themselves, facts do not give us reality; on the contrary, they hide it, which is to say that they present us with the problem of reality. If there were no facts, there would be no problem, there would be no enigma, there would be nothing hidden which is necessary to de-hide, to dis-cover. . . . In order to discover reality we must for a moment lay aside the facts that surge about us, and remain alone with our minds. (1958:89)

Notes

1. On an assumption that the computational system feeds the lexicon, the lexicon could potentially contain entries for any of the zero verbs.

2. That this distinction is idiosyncratic, and thus subject to change, was underscored by Colin Powell in a recent editorial commemorating Fathers' Day: "Traditionally, fathering meant to beget a child—to perform the male role in conception. To most people today, however, fathering means to perform the child-rearing functions of a father . . . shouldering the responsibilities of fatherhood for children other than their own." (Scripps Howard News Service, June 20, 1999).

3. For an insightful discussion of the semantics of particles, see Lindner 1982.

4. There are numerous partitive denominal verbs which, unlike *delint*, are zero verbs not formed with *de–*: *gut, husk, shell, skin*, etc. (see Appendix). In most cases the base noun of these partitive zero verbs is an inherent body part, thus distinct from base nouns like *lint*.

5. The ambiguity of (13a) also reflects the ambiguity of *the*.

6. Two examples of Figurative Goal verbs seem to take on an Agent verb meaning when in an intransitive context:

i) They volunteered the secretaries for emergency duty
   The secretaries volunteered for emergency duty
ii) We apprenticed him as a ship's cook
   He apprenticed as a ship's cook

7. Certain zero verbs in other categories also detransitivize with an aspectual particle:

We piled the dirt (up) in the corner
Dirt piled *(up) in the corner

8. Of the 115 Mandarin verbs identified as zero derived denominals by Chan and Tai (1994), most occur in modern Mandarin usage in compounds for the noun form (Zhaohui Cheng, p.c.):

shua	'to brush'
**shua*	'brush, n.'
shua-zi	'brush, n.'

9. I am informed that Arabic is another (Mohammad A. Mohammad, p.c.).

APPENDIX:
LIST OF TRANSITIVE ZERO VERBS

This list consists of all the transitive zero verbs attested and categorized by Clark and Clark (1979:772-780), plus additional examples I have found (indicated by a double asterisk). Not included are zero verbs which appear to take an expletive object (e.g. *lord it* over someone; *black-tie it* to the dinner) and zero verbs which are only attested in the *way*-construction (e.g. *motorcycle one's way* across the country; *oriole one's way* around the floor). Also excluded are zero verbs derived from proper names of individuals. Following Clark and Clark, I have marked innovative verbs with a single asterisk and provided sample direct objects where it was felt it would aid interpretation. In some cases, however, innovations listed by Clark and Clark were given with no sample direct object.

Goal Verbs

	Location Verbs	Sample Direct Object
1	air	the clothes
2	archive**	
3	bag	
4	ballpark***	the answer (estimate)
5	bank	your money
6	banner*	the message
7	barn*	the cows
8	barrel*	the apples
9	beach	
10	bed	the children
11	bench	
12	berth	the boat
13	billet**	
14	billfold*	the money
15	bin**	
16	bivouac	the soldiers

	Location Verbs, continued	Sample Direct Object
17	blacklist	
18	blueprint*	the plans
19	book	the reservation
20	bottle	
21	boundary	the ball (cricket)
22	box	
23	brine*	the pickles
24	bulletin*	the news
25	bunk*	the children
26	cache	the booty
27	cage	
28	can	
29	card*	the example
30	case	the violin
31	casket*	the jewels
32	catalog	
33	cellar	the wine
34	center	the picture
35	chart	
36	church	the women (after childbirth)
37	cloakroom*	your briefcase
38	cloister	
39	closet*	the clothes
40	clothes-horse*	the trousers
41	clothes-rack*	the hat
42	club***	the youths (organize into clubs)
43	coffer*	the jewels
44	coffin*	the body
45	coin-purse*	the pennies
46	coop	the chickens
47	corner	the ball
48	corral	
49	cradle	the baby
50	crate**	
51	creel*	the trout
52	cupboard*	the groceries
53	curb	
54	dairy*	the milk
55	desk*	the papers
56	dish	the food out
57	disk***	the report
58	ditch**	
59	dock	the boat
60	docket	
61	document**	your findings
62	dog-pound***	

	Location Verbs, continued	Sample Direct Object
63	doormat*	the boots
64	drydock	the boat
65	dump**	
66	earth	the badger (hunting)
67	easel*	the painting
68	field	the candidates
69	file	
70	file-cabinet*	the letters
71	film	
72	flask*	the whisky
73	floor	the accelerator
74	footnote*	your colleagues
75	format**	the document
76	front-page*	the scandal
77	garage	
78	graph	
79	greenhouse*	
80	ground	
81	hangar*	the airplane
82	harbor	the boat
83	headquarter	the troops
84	heel**	your dog
85	hip	your opponent (wrestling)
86	hive*	the bees
87	hole*	the ball
88	home-school***	your children
89	hook*	the cups
90	horse	the troops
91	house	
92	hut*	?
93	ice**	the champagne
94	index**	
95	inventory	
96	island*	?
97	jail	
98	jar**	
99	jug*	the thief
100	keg*	the beer
101	kennel	
102	keyboard*	the cyrrillic alphabet
103	land	the plane
104	list	
105	litter-basket*	your empties
106	lodge	the guests
107	log	
108	lot**	

	Location Verbs, continued	Sample Direct Object
109	map	
110	market	the goods
111	mind**	your manners
112	minute*	the committee's decision
113	mire	the horses
114	mothball	the sweaters
115	nest	
116	orbit*	the satelite
117	package	
118	palm	the card
119	parcel	the goods out
120	parking-meter*	the car
121	pasture	the cows
122	peg**	
123	pen	the animals
124	pigeonhole	the bill
125	piggy-bank*	the nickles
126	pillory	the convict
127	plastic-sack***	
128	pocket	
129	porch*	the newspaper
130	pot	the begonias
131	pouch*	the tobacco
132	quod	the burglar
133	rack	the balls (pool)
134	railroad**	someone
135	register	the guests
136	sack	the potatoes
137	scabbard	the sword
138	scaffold***	
139	schedule	
140	school	
141	screen	the movie
142	seat	
143	sheathe**	
144	shed*	the cows
145	shelter	
146	shelve	
147	short-list*	the applicant
148	showcase*	the product
149	shrine*	the relics
150	sick-list*	the employee
151	sideline**	the player
152	sidetrack	
153	sidewalk*	
154	silo*	the corn

Location Verbs, continued		Sample Direct Object
155	site*	the power plant
156	sky*	your surplus guests
157	slate	
158	snapshot*	your team
159	spindle**	
160	spit	the chicken
161	spool	
162	spot	the ball (football)
163	stable	the horses
164	stage	the play
165	stall*	the horse
166	station	the troops
167	stomach**	"I can't stomach that"
168	strand	
169	string	
170	sty*	the pigs
171	sun	yourself
172	table	the motion
173	tail	someone
174	tanker*	extra fuel
175	tape	the music
176	terrace**	
177	thread	the beads
178	tin	the peaches
179	tree	the possum
180	tub**	
181	tube**	
182	vault**	
183	wait-list*	the traveller
184	warehouse	the goods
185	window*	the view

Figurative Goal Verbs		Sample Direct Object
186	accordion*	the curtains
187	alphabet*	?
188	antique**	the furniture
189	apprentice	the youth
190	arch**	your foot
191	array	
192	baby	
193	bale	
194	ball	something up
195	balloon*	your clothes
196	beggar	your opponents

	Figurative Goal Verbs, continued	Sample Direct Object
197	billow**	
198	block	the hat
199	blot*	the ink
200	braid	
201	bulb*	your nose
202	bum**	someone out
203	bundle	
204	butterfly**	the shrimp
205	carpool*	the students
206	cash	
207	cast**	the sculpture
208	cave	the house in
209	chip**	
210	cipher	
211	cluster**	the dots
212	cocoon	someone in blankets
213	code**	
214	coil	
215	compartment***	espionage from the rest of foreign policy
216	concertina*	the place card
217	copy	something
218	countess*	the woman
219	crab**	
220	cream	the butter
221	cripple	
222	crook	
223	crumb*	the bread
224	cube	
225	cuckold	your neighbor
226	cuneiform*	the message
227	cup	your hands
228	curl	
229	dice	
230	dupe	
231	dust**	someone
232	dwarf	
233	ESL***	the curriculum
234	fillet**	
235	flake	the paint off
236	flame	the pudding
237	fool	someone
238	god*	the hero
239	group	the objects
240	gull	the onlookers
241	halve**	
242	heap	

	Figurative Goal Verbs, continued	Sample Direct Object
243	hinge*	your knee
244	hoard	
245	honeycomb	the cliffs
246	hostage*	the ambassador
247	image*	the scene
248	input**	the data
249	knight	
250	lather	
251	Latin*	the speech
252	lawn*	the grass
253	layer	
254	line	the boxes up
255	loaf*	the dough
256	loop	
257	lump*	the sugar
258	martyr	
259	mass	
260	match-stick*	the potatoes
261	monk*	the man
262	monolog*	the script
263	nose***	the gun barrel
264	order	the data
265	orphan	
266	outlaw*	the thief
267	pair**	someone with someone else
268	parade	the troops
269	parcel	the goods out
270	pawn	
271	photograph	
272	phrase**	the idea
273	pickle	
274	picture	
275	pile	
276	plait	
277	pleat	
278	pod*	the seals
279	pool	
280	portion	
281	powder	the aspirin
282	priest***	someone
283	profile**	
284	psalm*	?
285	purse**	your lips
286	quarter	
287	quilt	the coat
288	recruit	

Figurative Goal Verbs, continued		Sample Direct Object
289	regiment	the crowd
290	ringlet	
291	ruin*	the building
292	saint*	the reformer
293	sandwich	
294	scapegoat	
295	sculpture**	
296	segment	
297	sequence	the lessons
298	sheaf	the wheat
299	silhouette	the tree against the sky
300	skirt**	the issue
301	smoke	
302	sound	the alarm
303	spawn	an idea
304	spread-eagle*	your opponent
305	square	your fists
306	stack	
307	stockpile**	the goods
308	strand	the wool
309	sucker	someone
310	supersize***	your meal [McDonalds]
311	surplus**	the boats after the war
312	swarm	the bees
313	telescope**	the drinking glasses
314	tent*	the blanket
315	terrace	the slopes
316	trash**	your reputation
317	treasure	
318	verb***	your nouns
319	widow	
320	word	the sentence

Theme Verbs

Locatum Verbs		Sample Direct Object
321	acrylic*	the car
322	address	the envelope
323	alibi**	
324	allowance*	your children
325	almond-topping*	the cake
326	aluminum***	
327	arm	
328	asphalt	

Locatum Verbs, continued		Sample Direct Object
329	asterisk*	the sentence
330	badge*	the members
331	bail**	someone out
332	bait	
333	balm	
334	bandage	
335	barricade	
336	battlement*	the castle
337	beam*	the ceiling
338	beard*	the actor
339	bedspread*	the bed
340	beeswax*	the table
341	big-eye***	the food
342	billboard*	the highway
343	blanket	
344	blind-eye***	the poverty
345	blindfold**	
346	block	the road
347	blood	the huntsman
348	board**	
349	border**	
350	brand	
351	bread	
352	breast	the wave
353	bribe	
354	brick	the window up
355	bridge	the stream
356	bridle	
357	(re-)bristle*	your brushes [ad]
358	bronze**	
359	bruise	
360	bug	the room
361	bullshit**	someone
362	butter	
363	buttonhole*	the shirt
364	camouflage	
365	cap	
366	caption**	
367	carpet	
368	cast**	the play
369	caulk**	
370	cedar-shingle*	the house
371	chalk	
372	check**	the correct answer
373	chin	the bar
374	Christmas-gift*	each other

Locatum Verbs, continued		Sample Direct Object
375	chrome**	
376	cloak	
377	clothe	
378	cloud	the issue
379	clue**	someone in
380	coal	the ship
381	coat	
382	cobblestone*	the road
383	cocktail*	the diners
384	cold-cream*	your face
385	collar	the jacket
386	color**	
387	cork	the bottle
388	cover	
389	coverlet*	the bed
390	cream*	the coffee
391	cream-and-sugar*	the coffee
392	crease	
393	Crisco*	the pan
394	critique**	
395	cross	yourself
396	cross-reference**	
397	crown	
398	crumb*	the ham
399	cuff	the slacks
400	curb*	the street
401	curtain**	
402	cushion	
403	dam	
404	dart	the waist
405	date	the letter
406	diaper	
407	ditch**	the field
408	dog-ear	
409	dope	
410	dot**	
411	dress	
412	drug	
413	dust	the crops
414	earth*	the radio
415	echo**	
416	enamel	
417	extract-of-beef*	the bread [Punch]
418	face	the enemy
419	feather	your nest
420	fee*	the lawyer

	Locatum Verbs, continued	Sample Direct Object
421	fence	the yard in
422	festoon	
423	fig-leaf*	the statue
424	fine**	
425	finish**	the table top
426	fire	the kiln
427	flag	the towns on a map
428	flat-paint*	the walls
429	flour	
430	fodder	the sheep
431	fog	the window up
432	forest	
433	frame	
434	frost	the mug
435	fuel	
436	gag**	the defendant
437	garland	
438	garter**	
439	gas	the car
440	gift*	the city
441	glass	the porch in
442	glaze**	
443	gloss**	
444	glove	
445	graffiti*	the walls
446	graphite*	the lock
447	grass**	
448	gravel	
449	grease	
450	greenbelt*	the town
451	groove**	
452	ground	the wire
453	gusset*	the dress
454	gutter*	the street
455	halter	
456	handbill*	the people with information [NBC]
457	harness	
458	headline	the article
459	hedge	the road
460	(re-)heel**	
461	hem	
462	hemstitch*	the cuff
463	hole**	
464	horse	the soldiers
465	ice	the tea
466	IM***	someone (instant message)

Locatum Verbs, continued		Sample Direct Object
467	index**	
468	initial	
469	ink	
470	instant-message***	someone
471	jacket*	the child
472	jam*	the scones
473	jewel	
474	kerchief*	your hair
475	knot**	your tie
476	label	
477	lacquer**	
478	ladder	the nylons
479	lantern*	the windows
480	leather**	
481	lemon*	the tea
482	lemon-icing*	the cake
483	lesson***	someone [Amy Tan]
484	letter	the sign
485	license-plate*	the car
486	lid*	the jar
487	ligase	the DNA
488	lime*	the wall
489	line**	the street
490	linoleum*	the kitchen
491	lipstick**	
492	litter	
493	malt**	
494	man	
495	mantle**	
496	marmalade*	the toast
497	mask	
498	mast	the ship
499	message*	the president
500	mirror**	
501	mist	the houseplants
502	mulch**	
503	muzzle	
504	name	
505	nametag***	the guests
506	nappy	
507	newspaper*	the shelves
508	nickel**	
509	nickname	
510	number**	
511	oil	
512	oil-paint*	the walls

	Locatum Verbs, continued	Sample Direct Object
513	oilcloth*	the table
514	orbit	the moon
515	ornament**	
516	pad	
517	paint	
518	Pamper*	the baby
519	panel	
520	paper	
521	parquet*	the floor
522	partition	the room
523	patch	
524	pattern*	the plate
525	pearl*	the headdress
526	pension	
527	people	
528	pepper	
529	perfume	
530	personnel*	the office
531	petition	
532	pickle*	the hamburger
533	picture*	the walls
534	piece	the quilt together
535	pill*	the cat
536	pit*	the paint
537	pitch**	
538	placard*	the the wall
539	plank*	the floor
540	plaster	
541	plug	
542	poison	
543	polka-dot	
544	polyurethane	
545	pomade	
546	postcard*	your friends
547	poster	the walls
548	postmark**	
549	powder	
550	price**	the goods
551	provision***	the sailboat
552	Quaker State*	your car [ad]
553	question-mark**	
554	rafter*	the house
555	rainbow*	"neon rainbows the streets"
556	receipt*	the bill
557	redline**	the chart (hospital)
558	reference**	

	Locatum Verbs, continued	Sample Direct Object
559	rein	the horses in
560	resin*	your shoes (ballet)
561	rime*	the window
562	ring*	your fingers
563	ring-road*	the town
564	robe	
565	roll*	the trees with toilet paper
566	roof	
567	rosin**	
568	rotten-egg*	the speaker
569	rouge	
570	rug	the horses (Brit.)
571	rut**	
572	saddle	
573	salt	
574	salt-and-pepper	
575	salve	
576	sand**	the driveway
577	sawdust	
578	scar	
579	script	the movie
580	seal	the document
581	seam*	the dress
582	seed	
583	sequin	
584	serenade	
585	shaft	the arrow
586	shag-rug*	the floor
587	shawl*	the child
588	sheet*	the furniture
589	shellac	
590	shelve	the library
591	shingle**	
592	shirt*	the model
593	shit**	"you're shitting me"
594	shoe	
595	short-circuit**	
596	shroud	
597	shutter**	
598	signpost	the entrance
599	silver**	
600	slate**	the pathway
601	slipcover	
602	snowball*	the visitor
603	soap	
604	sod**	the lawn

Locatum Verbs, continued		Sample Direct Object
605	soil	the clothes
606	(re-)sole**	
607	soot**	
608	space**	the letters out
609	spam***	someone (send junk email, spam)
610	span	the river
611	spice	
612	spot	the cloth
613	spray-paint	
614	staff**	the office
615	stain**	
616	stair-rod*	the carpet
617	stamp	
618	star	
619	starch**	
620	stay	the collar
621	stepping-stone*	the stream
622	stitch	
623	stonewall**	the investigation
624	stopper	
625	string	the guitar
626	stucco**	
627	(re-)stump*	your house (put in new supports)
628	sub-head**	the paragraph
629	subpoena	
630	sugar*	the fruit
631	sugar-coat**	the request
632	suit**	the divers up
633	sulphur**	
634	summons	the witness
635	surface	the counter with formica
636	sweater*	the child
637	tag	
638	talc	
639	tar**	the roof
640	tar-and-feather	
641	tarmac*	the road
642	tassel**	
643	tattoo**	
644	tea-cosy*	
645	tenant	
646	thatch**	
647	thread	the needle
648	ticket	
649	tile	
650	timber*	the house

Locatum Verbs, continued		Sample Direct Object
651	tin*	each other (throw pie tins at)
652	tin-can*	the wedding car
653	tip**	the waitress
654	title**	
655	toe**	the line
656	toilet-paper**	the house
657	tomato*	the passerby
658	tool**	
659	trade-name***	the product
660	transition***	the employees
661	tree	the avenue
662	trouser*	the boy
663	trustee*	the property
664	tube***	the tires
665	tunnel*	the mountain
666	turf*	the yard
667	uniform*	the guards
668	varnish	
669	veil	
670	veneer**	
671	vine*	the terrace
672	wall	the garden
673	wallpaper	
674	water	
675	water color**	
676	water-paint*	the walls
677	watermark	
678	wax	
679	wax-seal*	the letter
680	whiteout**	
681	whitewash	
682	wig*	the actress
683	wool-carpet*	the floor
684	wreathe**	
685	wrinkle	
686	yoke	
687	zipcode	

Partitive Locatum Verbs		Sample Direct Object
688	bark*	the tree (your knee?)
689	beard	the oysters
690	bone	
691	brain	
692	bur	the wool
693	burl	the cloth

	Partitive Locatum Verbs, continued	Sample Direct Object
694	card**	someone (take proof of age)
695	core	
696	deadhead***	the dahlias
697	dust	
698	feather	the goose
699	fin*	the fish
700	fish	the stream
701	flea*	the dog
702	fleece	
703	flesh*	the hide
704	gill*	the fish
705	girdle	the tree
706	grallach	the deer (hunting)
707	gut	
708	hay	the field
709	head	the willow
710	hide*	the rabbit
711	hull	
712	husk	
713	juice	
714	limb*	the tree
715	lint*	the clothes [Consumer Reports]
716	log	the west slopes
717	loot	
718	louse	
719	milk	
720	pants	the boy
721	peel	
722	pillage	
723	pinion	
724	pip	the grapes
725	pit	
726	pith**	
727	pod**	
728	poll/pollard	the tree
729	pulp**	the orange
730	rind*	the lemon, bacon
731	sample**	the soup
732	scale	
733	scalp	
734	seed**	
735	shell	the peanuts
736	shuck	
737	skin	
738	snail**	
739	stalk*	the elder flowers [recipe]

Partitive Locatum Verbs, continued		Sample Direct Object
740	stem*	the grapes
741	stone	the dates
742	string**	
743	sweat	the horse (riding)
744	tail**	
745	tassel**	
746	timber*	off the top fields
747	top**	
748	vein**	
749	weed	
750	wind	to get winded
751	worm	
752	zest**	

Instrument Verbs		Sample Direct Object
753	Ajax*	
754	ambulance	
755	anchor	the chair to the floor
756	anvil*	the horseshoe
757	arm*	someone out of the way
758	autoclave	
759	avalanche*	the village
760	ax	
761	backdoor***	your neighbor
762	bad-mouth	
763	bad-word*	bad-worded 007 [Fleming]
764	balance	
765	band**	
766	bankroll	the venture
767	bar	
768	bargain-counter*	the Bible [Thurber]
769	barge	
770	barrow*	
771	bat	
772	bath*	
773	bayonet	
774	beam***	beam me up Scotty
775	bear-trap	
776	belt	
777	bill-hook*	
778	blackball	
779	bleach**	
780	blender*	
781	block	
782	blockade	

Instrument Verbs, continued		Sample Direct Object
783	blue-pencil	the manuscript
784	bolt	
785	bomb	
786	boot	
787	bottle*	
788	bracket**	
789	brake	
790	broadax*	
791	broom*	
792	brush	
793	buckle	
794	bugle*	
795	bullwhip	
796	buoy**	
797	bus	
798	button	
799	cable	
800	cane	
801	carbon-monoxide*	yourself to death
802	cart	
803	catapult	
804	cellotape	
805	celluloid*	the lock
806	cement	
807	centrifuge	
808	chain	
809	chamois	
810	charcoal	the sketch
811	chisel	
812	chopper*	the wounded to safety
813	chopstick*	
814	Christian-name*	someone [Thackeray]
815	church*	the savages
816	Clairol*	your hair
817	clamp	
818	clasp	
819	claw	
820	clip**	the pages together
821	clock	
822	club	
823	comb	
824	cordon	the area off
825	cork	a mustache (theater)
826	crayon*	the walls
827	crutch*	the branch
828	dam	

Instrument Verbs, continued		Sample Direct Object
829	dial	the number
830	ditto	
831	door-step***	the residents for information
832	drill	a hole
833	duct-tape**	
834	dye	
835	dynamite	
836	e-mail**	
837	elbow	
838	epoxy*	
839	eye	
840	eyeball	
841	eyebrow*	your surprise
842	fan	
843	fax**	
844	fed-ex**	the package
845	ferry	
846	fetter	
847	fiddle	
848	file	
849	filter	
850	finger	the material
851	fire-bomb	
852	flag	someone down
853	flannel*	your face
854	floor-sweeper*	
855	floss	
856	foot	the ball
857	fork	the shrimp
858	frag	
859	funnel	
860	fusillade***	
861	garotte	
862	gas	the demonstrators
863	gavel	
864	gin	the cotton
865	glue	
866	grenade	
867	guarantee**	
868	guillotine	
869	gum	your food
870	gum	the envelope
871	gun	someone down
872	gyve	
873	hacksaw	
874	hairpin*	the lock

	Instrument Verbs, continued	Sample Direct Object
875	hammer	
876	hand	
877	handcuff	
878	harp*	
879	harpoon	
880	hasp*	
881	hatchet*	
882	head	the ball(soccer)
883	heel*	the broken glass aside
884	helm	the boat
885	hoe	
886	hook	
887	Hoover	
888	hose	
889	ice	the boat in
890	ink*	someone (sign someone on)
891	iron	the clothes
892	jack	the car up
893	jaw	the truant
894	jet	
895	key**	something in
896	knee	
897	knife	
898	knuckle*	someone's face
899	lace	the shoes
900	ladle	
901	lance	
902	lasso	
903	latch	
904	launderette*	
905	lease**	
906	leash	
907	lever	
908	light**	the room
909	lime	the bird
910	lip*	the sugar lump
911	lobby	
912	lock	
913	long-distance*	
914	M-1*	
915	mace	the mugger
916	machete	
917	mail	
918	manacle	
919	masking-tape*	
920	medivac***	the accident victims

Instrument Verbs, continued		Sample Direct Object
921	meter	
922	microwave	
923	mill	the grain
924	mitt*	(shake hands)
925	mold**	the jello
926	mop	
927	mouthe	
928	mud	mud in the holes of a bird's nest
929	nail	
930	napalm	
931	net	
932	nettle*	the children's legs
933	nose*	the bone
934	nursery*	the tomatoes
935	oar*	
936	OCR***	the manuscripts
937	paddle	the boat
938	padlock	
939	paper-clip	
940	parachute	the goods
941	paste	
942	paw**	
943	pedal	the bicycle
944	pen	the reply
945	pencil	the answer in
946	phone**	
947	pin	
948	pipe	the oil
949	pitchfork	
950	plane	the boards
951	plea-bargain**	your offense down
952	plow	
953	pole	the boat
954	poleax	
955	print	
956	pulley*	the pail up
957	pump	
958	pushcart*	
959	putty	
960	rack	the prisoner
961	radio	
962	rake	
963	ransom	
964	rawhide*	
965	razor*	
966	red-pencil*	the errors

Instrument Verbs, continued		Sample Direct Object
967	reel**	
968	requisition	
969	riddle	the potatoes
970	right-mouse***	the icon
971	ripsaw*	
972	Rit*	the fabric
973	rivet	
974	rock*	
975	rope	
976	ruler*	the child's hand
977	sabre*	
978	sail	the boat
979	sandbag	
980	sandpaper*	
981	satellite*	the news
982	saw	
983	school-bell*	the class to order
984	scissor	through the wire
985	scoop**	
986	scotch-tape	
987	screen	the street from view
988	screw	
989	scull	
990	scythe	
991	seat-belt*	
992	seine	
993	semaphore*	
994	sewing-machine*	
995	shackle	
996	shaft**	
997	shampoo	
998	shell	
999	shield	
1000	shillelagh	
1001	ship	
1002	shoe-heel*	?
1003	shoehorn*	your shoes on
1004	shoulder	
1005	shovel	
1006	shower	
1007	sieve	
1008	sight**	the target
1009	siphon	
1010	sir*	the general
1011	skeleton-key*	
1012	skewer**	

Instrument Verbs, continued		Sample Direct Object
1013	smoke	the fish
1014	snap	
1015	snare	
1016	snowplow	
1017	soap-and-water*	
1018	solder	
1019	spade	
1020	spatula*	
1021	spear	
1022	sponge	the makeup off
1023	spoon	
1024	spork***	(spoon-fork utensile)
1025	spur**	
1026	staple	
1027	steam	the vegetables
1028	steam-iron*	
1029	steel-toe***	him back to Kentucky
1030	steel-wool	
1031	sten*	down the mugger
1032	Stimudent*	
1033	stone	
1034	straight-arm	someone
1035	straitjacket	someone
1036	strap	your boots on
1037	stretcher*	
1038	surf	the coast
1039	tablespoon*	
1040	tack	
1041	tail	
1042	tanker*	the oil
1043	tape	
1044	tear-gas	
1045	teaspoon*	
1046	telegraph	someone
1047	telephone	someone
1048	term-limit***	the congressman
1049	tether	
1050	thong*	thong the sandals on
1051	thumb	
1052	thumbtack**	
1053	TNT*	
1054	tomahawk	
1055	tombstone**	your opponent (wrestling)
1056	tongue	the note (music)
1057	toothpick*	the shrimp
1058	torch	

Instrument Verbs, continued		Sample Direct Object
1059	torpedo	
1060	towel	the glasses off
1061	track	
1062	trail	
1063	trailer*	
1064	trap	
1065	trowel*	
1066	truck	
1067	trumpet*	
1068	tusk*	
1069	type	
1070	vacuum**	
1071	vent**	your anger
1072	Vim*	
1073	voice**	your objections
1074	wagon*	
1075	washcloth*	your face
1076	web*	his clothes to the wall(Spiderman)
1077	wedge	
1078	weight**	something down
1079	wheel	the patient into surgery
1080	wheelbarrow	
1081	wherry	
1082	whip	
1083	will**	
1084	winch	
1085	Windex*	
1086	wire	
1087	wiretap**	
1088	wrench	
1089	x**	something out
1090	x-and-m*	the typo out
1091	x-ray	
1092	xerox	
1093	zeppelin*	the fleet [H.G.Wells]
1094	86	someone (get rid of; Proposition 86)

Agent Verbs		Sample Direct Object
1095	agent*	the book
1096	ape	the politician
1097	author	
1098	badger	
1099	bird-dog	the escapee
1100	bodyguard**	

Agent Verbs, continued		Sample Direct Object
1101	boss	
1102	broker	the deal
1103	buck	someone up
1104	buffalo	the audience
1105	bug**	someone (bother)
1106	bully	
1107	bum**	a cigarette
1108	butcher	the cow
1109	captain	
1110	chairman*	the department
1111	champion	
1112	chaperone	
1113	chauffeur**	the children
1114	chicken***	someone out
1115	companion*	the queen
1116	copycat*	the teacher
1117	crane	your neck
1118	doctor	
1119	dog	the escapee
1120	dragoon	
1121	duck	your responsibilities
1122	emcee	
1123	escort	
1124	father	
1125	ferret	something out
1126	fishwife*	each other
1127	fox*	the people
1128	general*	the army
1129	guard	
1130	heir*	the estate
1131	high-hat*	the guest
1132	horse***	us around [Patterson]
1133	hound	the politician
1134	housewife*	the money
1135	husband	
1136	jock**	someone (act tough)
1137	jockey	the horse
1138	knight	?
1139	marshal	
1140	master	
1141	mentor**	
1142	mob	
1143	model	the clothes
1144	monitor	
1145	mother	
1146	needle**	someone

Agent Verbs, continued		Sample Direct Object
1147	nurse	
1148	nursemaid	the baby
1149	page**	someone
1150	parent*	the children
1151	parrot	every word
1152	partner	the host
1153	picket	the factory
1154	pickpocket	a tourist
1155	pilot	
1156	pimp**	his girlfriend
1157	pirate	
1158	police	
1159	porter**	
1160	quarterback	the team
1161	rat	someone out
1162	referee	
1163	rival	
1164	seagull***	someone (bother for food)
1165	shadow	someone
1166	shepherd	
1167	sire	
1168	skipper	
1169	skua***	some food
1170	slut**	the teacher (for good grades)
1171	spaniel*	spaniel'd me at heels [Shakespeare]
1172	spirit	something away
1173	squire	
1174	squirrel	the money away
1175	tailor	
1176	Truth***	someone (criticize for smoking)
1177	tutor	
1178	umpire	
1179	uncle*	someone
1180	usher	
1181	valet	the squire
1182	vaquero*	the cows
1183	vet	the dog
1184	volunteer	the information
1185	voyeur***	the couple
1186	watchdog*	the house
1187	wife	someone
1188	witness	the accident
1189	wolf	the food down
1190	wonk***	health care policy

Miscellaneous Transitive Zero Verbs

1191	bank**	the shot
1192	bean	the catcher (baseball)
1193	blindside	
1194	broadside***	someone (hit on the broad side)
1195	buttonhole**	someone
1196	fingerprint	the suspect
1197	hamstring**	
1198	jaw*	the swimmer
1199	joint	the chicken
1200	kneecap	
1201	lip*	his ball lipped the cup (golf)
1202	mine	the gold
1203	overnight***	the package
1204	quarry	the marble
1205	rear-end	
1206	rim	the glass with salt
1207	root**	something out
1208	something***	someone [tv show]
1209	source***	the money (find the source)
1210	top**	the icecream
1211	whatever***	someone [tv show]
1212	wine-and-dine**	someone
1213	wing	

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